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ABSTRACT

This report presents the results of a field test, the purpose of which was to determine the effects on school system management, decisions, and operations of the introduction of specially prepared information on the relative achievement levels of schools and grades serving students of similar economic levels. A relatively simple and economical system of visually unmistakable signals was introduced so that decisions, especially at managerial levels in a large urban school system, would not have to be made in a vacuum -- that is, without clear indications of schools and grades where unusually high or low performances were being achieved. The introduction of the signals during the 1972-73 school year, with excellent cooperation by Atlanta school personnel, found in part that school officials readily accepted the signals as an understandable mechanism that they could use to diagnose performance; personnel division staff used signals to improve procedures for screening new applicants; but that signals seemed to play little or no part in decisions regarding instructional programs and textbook adoption. One major implication of the findings for large urban school systems is that decisions concerning the operation of the school which are made higher up in the administrative structure are generally made without information regarding performance at the classroom level.
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THE ATLANTA PROJECT: HOW ONE LARGE SCHOOL SYSTEM RESPONDED TO PERFORMANCE INFORMATION

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CHAPTER I

IMPROVING THE MANAGEMENT OF PUBLIC SCHOOL SYSTEMS: A TEST OF SIGNALS OF RELATIVE SCHOOL PERFORMANCE

A. INTRODUCTION

This report presents the results of a field test conducted by the Program Evaluation staff of The Urban Institute in the Atlanta Public School System during the 1972-73 school year. The purpose of the test was to determine the effects on school system management, decisions, and operations of the introduction of specially prepared information on the relative achievement levels of schools and grades serving students of similar economic levels.

Student performance has become an issue in many large urban school systems. In Atlanta, for example, the school system is now required to make public school by school achievement test results. School systems have tried a variety of approaches in attempts to improve student performance, but school administrators typically do not know how successful their own efforts or the efforts of others have been. The federal government has required evaluation of individual projects and in so doing has added to local interest in student performance, but information from federally required evaluations has generally played little or no part in school system planning or administration.

Officials with major management responsibilities in large school systems often do not know precisely where to look for success or failure. Present indicators of success or failure in the classroom grow progressively weaker as distance from the classroom increases. Part of the problem stems from the absence both of clearly stated goals and objectives for education and of agreed-upon measures of success in meeting those goals. Even in the limited area of a school system's success in teaching basic skills, however, the parties to a discussion of success or failure rarely use the same set of assumptions and measurements in identifying success or failure, and the data used in any discussion are rarely current.

In a large school system, the duties of management above the level of the school principal include many support functions not directly tied to the performance of the students. Support functions such as payroll, facilities, equipment, personnel functions, ensuring compliance with state and federal laws, and purchasing offer economies of scale in a large system and are generally performed by centralized units.

Our examinations of large school systems have found organized management in the support area, but no well-defined management structure aimed at systematically improving student performance. The setting of minimum acceptable levels of performance and assurance of quality in the areas of instruction and curriculum are generally accepted as system-wide functions. Management tools for applying even these limited standards, however, are rarely available. The reason generally given for this lack is the difficulty of creating performance indicators that are current, readily interpretable, accessible to decision makers, and yet specific enough to be the basis for decisions and actions aimed at improved performance.

While The Urban Institute continued to explore the question of what would constitute school system management approaches aimed at improving performance, an early effort was made to remedy the lack of accessible and interpretable performance information. This was done in order to test the extent to which lack of information about student performance has impeded efforts to improve performance in large school systems.

Our exploratory effort into these management questions was initiated in January 1971, using Urban Institute research funds, and expanded in January 1972, when support from the Office of Economic Opportunity was obtained. Phase I of that effort (ending in October 1972) produced usable performance information.[1] The technique used existing school system data on student achievement and participation in the subsidized school lunch program to locate specific grades in individual elementary schools in which the level of average student performance was significantly better or worse than the level of performance in schools of similar economic level.

The Phase II work reported here (November 1972 to November 1973) was designed to make information on relative school performance widely available in a school system and to observe the influence of this information on decision making in areas related to student performance. Signals of relative school performance covering school years 1970-71 and 1971-72 were created and introduced into the school system in the fall and early winter of 1972, and a detailed study was made of the impact of that information on the actions of school officials.

Two results were expected from this effort. First, a test would be made to determine if the provision of performance information to an operating school system produces different management decisions. Second, in the process of that test, better information would be acquired on how the school system management actually attempts to influence performance.

Since January 1971, staff from The Urban Institute and the Atlanta Public School System have worked together to define and shape various aspects of this project, including the work reported here. Although information from other school systems and other research results have also been of value, it was decided early in our research efforts to use an actual large school system as a "laboratory" in order to force the development effort to deal with reality. The Urban Institute staff chose Atlanta from among several large urban school systems because it tested all students twice yearly, had sufficient data available to explore a variety of performance questions, maintained a strong systemwide interest in improving performance, and had personnel who would fully support the basic aims of the project. This cooperation has never wavered and, as a result of this relationship, we are now in a position to discuss large urban school systems as they actually function.

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[1] See Bayla F. White et al., The Atlanta Project: Developing Signals of Relative School Performance, The Urban Institute, October 1972.

B. THE URBAN INSTITUTE APPROACH

School administrators are overwhelmed with numbers. All too often, the response of researchers has been to create new and different numbers. The approach used here was to make comparisons of the relative performance of schools serving similar students, identify significant cases of extreme performance, and display the results as a series of charts in which red "signals" denote levels of relatively low performance and blue "signals" denote levels of relatively high performance.[2] This signaling technique permits compact displays of information on the relative performance of every grade in a school for several years and for different subject areas or for every grade in every school in an administrative area for successive years. In this way, a large amount of information of high interest to the school system management can be extracted from the existing data and provided in a compact, accessible form.

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[2] See Chapter II, p. 25 ff. for a description of the technique used to derive and display "signals."

Even though there is much argument about the applicability and accuracy of achievement tests, there is general agreement that students in elementary schools should learn to read and to solve simple arithmetic problems. By using relative comparisons and by being conservative in setting boundaries for what is to be considered "extreme" performance, this approach provides an answer to a question of great interest to school system administrators: "Where exactly are our successes and our failures?"

The following hypothesis was then tested by the Urban Institute in Atlanta during the past year:

> Information on relative performance, when introduced into a sufficiently well-understood planning and management structure, does (or does not) produce measurable changes (a) in the decision-making process of a local school system, (b) in the decisions made by school officials, and (c) ultimately, in school performance.

In its simplest form, the hypothesis should be viewed as a test of whether the provision of performance information alone is sufficient to produce purposeful systemwide changes in management in the area of performance. Such information is certainly a necessary condition, for without usable performance information, decisions cannot be based on the results of past actions. The presence of good performance information alone, however, may not be sufficient to cause a large school system to change its decision-making processes. To test the effects of relative school performance information on a large school system, compact performance information was made available, and a detailed study was made of the impact of the information upon system operations.

This year of study focused on those portions of the school system which have some immediate, direct impact on the classroom and might therefore respond to the new information within the short time span of this study. Based on the earlier work in Atlanta, it had become apparent that the introduction of signal information would not have an equal impact on the operation of all parts of the school system. Administrative units were identified for study on the basis of two criteria. First, there had to be some direct interaction between the unit and the classroom. Second, the administrative unit had to have some flexibility and discretion to react to signal information. Moreover, Urban Institute staff and our advisory board in Atlanta selected for study the management of the following three activities:

- Recruitment, assignment, and reassignment of teaching staff
- Design of the instructional program and provision of instructional materials
- Improving the skills of classroom teachers.

The study attempted to learn how these activities are normally conducted in Atlanta, what impact the introduction of signals had on these activities, and the resulting effect upon performance in classrooms. Research into these activities was based on extensive structured interviewing, surveys, formal reporting by Atlanta Public School personnel, and attendance by Urban Institute staff at numerous operational and staff meetings in Atlanta.

In considering the information presented below, it is important for the reader to keep in mind two facts about the activities presently occurring within the school system:

- Actions taken to improve performance must somehow do so through their effect on the education taking place in the classroom. In the material below, each management activity is examined in terms of the impact of the activity on the classroom and in terms of the use or non-use of information about relative school performance.
- There is no agreement on the extent to which these activities should rely on performance information. No one yet knows precisely how performance information can best be used to manage school activities or even which management approaches will result in improved student performance.

C. SCHOOL SYSTEM MANAGEMENT AND PRACTICES BEFORE THE INTRODUCTION OF SIGNALS

This section summarizes the operational characteristics of the school system before the introduction of signals. A goal of The Urban Institute research effort has been to understand and improve the management of large urban school systems. It is important, in order to do this, to understand how school systems are managed at present. Not only has the Atlanta School System provided an excellent source of data for developing the signals, it has also provided The Urban Institute with a unique opportunity to observe closely the operations of a school system and to examine how management decisions are made and implemented. Atlanta Public Schools staff members have fully cooperated in providing information on their activities, greatly facilitating our collection of operational data. Independent of our findings on the effects of signals on the operation of the school system, several factors have been identified concerning the management of school systems which appear to have significance for Atlanta and other large urban school systems.

Atlanta, like most large school systems, operates through a line management chain that starts with the classroom teacher. The chain goes up through school principals to an Area Superintendent, and on to the Superintendent and his immediate staff, who report to an elected School Board. Specialized support functions such as personnel, finance, instructional services, research and development, and buildings and facilities are handled by separate staff divisions headed by Assistant Superintendents who report directly to the Superintendent. Area Superintendents are responsible for the operation of the school system within their geographic Areas. In Atlanta, the Area Office has a support staff composed primarily of Resource Teachers. These

Resource Teachers can be characterized as experienced teachers who provide specialized assistance to the principals and teachers in individual schools. The school system is managed through a direct line organization, supported by a fairly large and complex bureaucracy with distinct organizational lines and some overlapping functions.

General observations made on school system operation in the period before signals were introduced include the following:

- Information on the performance of students was, in general, neither available to nor used by management units other than the classroom teacher, principals and Resource Teachers.[3] Available performance data dealt for the most part with absolute performance levels, rather than with information on variations in performance among schools and grades serving similar children.
- In general, mechanisms were lacking for activities of the central school system management to be tailored to actual variations in performance among or within schools.

There have been attempts by various organizational units or programs to apply resources selectively to particular grades and schools; however, in nearly every case examined, either the thrust of the activity was diminished or its direction was altered as the activity filtered down to the classroom level.

Several more specific results are cited below to support these general conclusions about the operations of the school system prior to the introduction of signals. While these specific results may seem unique to Atlanta, evidence from other cities indicates that the general results are applicable to other large urban school systems as well:

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3. An exception to this was the Comprehensive Instructional Program (CIP) which had created a system for supplying teachers directly with information about their students. CIP has also used achievement data in attempts to evaluate its own efforts.

Atlanta's Research and Development Department has generated and distributed absolute performance information and relative gains during the course of this study. This information, which is complementary to signals, was also distributed in 1972-73.

- In the personnel area:

  --New teachers have been hired and initially assigned without any attempts to use the specific performance record of the group of students eventually taught.

  --Principals have no advance information about the characteristics of teachers new to the school (e.g., information on the teachers' instructional strengths and weaknesses).

  --Principals have little input into decisions about which teachers will be assigned to their schools; those making the decision do not have available student performance information in a form that could be useful in making the decision.

  --The major factor which has governed staffing assignments is the need to meet the requirements of the court-ordered racial ratios in individual schools. Given this constraint, neither performance information nor the mechanisms to use such information was evident in decisions about the staffing of schools.

- In the instructional area:

  --The Instruction Division prepares the same curriculum guides for use in all schools. Once the guides have been circulated among schools, little or no information on the implementation of the curriculum reaches the Instruction Division. No formal mechanism exists to assess good practices among schools or faults in the curriculum.

  --The best example in Atlanta of the use of performance information occurs in the Comprehensive Instructional Program, which has developed a test for diagnosing the progress of students in mastering basic skills. Results of these tests, in the form of individual student profiles, have been provided directly to the classroom teacher. While the instructional process in the classroom could benefit directly from the teacher's use of these data, no comparable stream of performance data existed for use by the central staff in the design of instructional components.

  --Each Area Office has been assigned a staff of Resource Teachers, who are curriculum specialists and who spend a substantial portion of their time working with classroom teachers to improve the level of instruction. No assessment has been made of the effect those Resource Teachers have had on student performance.

--A textbook committee approves texts for use in the classroom,and the Textbook Coordinator on the Instruction Division staff advises individual principals on choosing textbooks. Both the textbook committee and the Textbook Coordinator operate without empirical information on variations in performance of Atlanta students using the various texts.

--Directors of special programs (e.g., Title I) design programs and make changes in programs generally using little information about the effects on the performance of students in the schools in which the programs are implemented, even though some information of this type is generated.

- In the staff improvement area:

--Although Resource Teachers make decisions on which grades (and sometimes which schools) to visit, these decisions are seldom based on relative student achievement information.

--No central records have been kept of the university courses, Instruction Division courses or Area in-service programs that teachers attend. The Personnel Division keeps some records for salary purposes. The effect of such training on student performance is unknown.

--Neither principals nor Area Superintendents are systematically informed of the teachers who complete courses. This has made intuitive evaluations by school system personnel of the effects of such courses impossible.

--Proficiency modules, a newly introduced teacher training program, are available to all teachers. Although successful completion of the module program entitles a teacher to a salary increment, no effort has been made to determine what effect completion of the modules has on student performance.

--A rating instrument designed to appraise classroom teachers' proficiency in the teaching of reading has recently been introduced. This instrument has not been validated to determine if its ratings correlate with the teacher's ability to improve the performance of the students.

--Classroom teachers and Resource Teachers seem to have little or no input into decisions made by the Instruction Division about in-service training offered.

--Neither the Instruction Division nor the Area Offices use student performance as a measure of the effectiveness of the courses or programs they offer to teachers.

These findings summarize the situation with respect to the availability and use of relative performance information. The findings do not represent an evaluation of the management activities of the Atlanta School System or any other system, nor has the feasibility of evaluating management activities through the use of relative student performance in the schools been established. What this preliminary work does represent is a survey to determine who might be interested in relative performance information as well as an attempt to establish how management efforts are presently organized. Our information to date indicates that management activities as described here are conducted in a similar manner in many school systems. Given this management environment, one could expect that personnel in a school system might respond favorably to the concept of signals displaying performance information--as they did. Most are committed to improving performance. However, one can also begin to anticipate that the chance of an effective management response from a school system's staff and line management elements to performance information might be low--as, in fact, it turned out to be. These results are discussed in the next section.

D. THE EFFECT OF INTRODUCING SIGNALS OF RELATIVE PERFORMANCE ON THE OPERATION OF A LARGE URBAN SCHOOL SYSTEM

The major thrust of the past year's study was to make relative performance information available to managers and administrators of the school system and to determine what effect the availability of the information had on the operation of the school system. Atlanta school officials cooperated wholeheartedly in the distribution and explanation of the signals and in facilitating our collection of information to document the effects observed.

Four general results which characterize the findings of this part of the study are the following:

- School officials readily accepted the signals and often had words of high praise for the signals as an understandable mechanism which they could use to diagnose performance in the school system and plan program activities.
- In only a few cases did these same officials give evidence of the actual use of relative performance information in making significant management decisions.
- There was little evidence of a shift of specialized school system activities to grade levels in schools which were signaled as extremely high or low in relative performance.
- In the few cases where activity did seem to be disproportionately allocated to grades having a particular type of signal, such as in a particular Area or with a particular Resource Teacher, there were converse allocations of effort which demonstrated that the signals were not having a consistent effect.

These general results are drawn from specific observations that were made throughout the school system on how and what decisions were made, how and to what extent they were implemented and what, if any, effect they had on classroom activities. Some more specific results of our analyses in the three areas on which we concentrated our attention are listed below:

- Personnel:

  --The Personnel Division staff showed an interest in using signals to improve procedures for screening new applicants and for reassigning current staff. There was, however, no evidence that anyone followed through on this interest and developed new screening or assignment techniques based on the signals.

  --Since no new elementary teachers were hired between January and September 1973, signals could not play a role in that activity this year.

  --Area Superintendents, who have authority over all transfers in teaching assignments in their respective Areas, generally did not use signals in making these decisions.

--One Area Superintendent did reassign several teachers who had been in a school with several red signals to schools with several blue signals in the hope that the teachers would be influenced by the high performance of teachers in their new schools. These assignments became effective in September 1973.

- Instructional Program:

  --In general, no evidence was detected of cases where signals were considered in decisions involving the shape of the instructional program for the school system.

  --More particularly, neither performance information in general, nor the signals in particular, seem to have affected the choice of pilot schools for the new elementary school curriculum or the appraisal of the program as it is being implemented.

  --The Instruction Division staff responsible for the Comprehensive Instructional Program (CIP), a program started three years ago to provide intensive assistance to teachers and students in reading and arithmetic, were familiar with signals but gave no indication of having used signals in the operation of the program. (In the past, CIP activity was evaluated with achievement test data, but this has been discontinued.)

  --Although several principals reported making decisions on the adoption of new textbooks this year for the coming years, signals played no part in the decisions about particular texts or materials.

  --In general, neither Area Superintendents, Curriculum Coordinators nor principals reported using signals or other performance information in discussions about the instructional programs--either in general or for specific schools or grades. In a few cases there was evidence of a principal using signals to support decisions on restructuring a particular instructional program.

- Improving the Skills of the Teaching Staff:

  --Two mechanisms for improving teacher skills were examined in depth: in-service training and direct assistance to classroom teachers through the Area Office Resource Teachers. In neither case is there evidence to support a conclusion that signals had a general, systematic and consistent effect on decisions concerning these activities or on the pattern of activities that resulted.

--In particular, except for one or two principals, no Atlanta school official reported using information from the signals in designing in-service programs or in determining who should attend them.

--When the school system is considered as a whole, the distribution of Resource Teacher activity to grades receiving signals indicating high, low or average relative performance is nearly identical to the proportion of grades having the various types of signals. That is, the observed distribution of assistance showed no tendency to disproportionately favor grades signaled as having a record of extreme relative performance--either high or low.

--When the distributions of Resource Teacher assistance are considered on an Area Office basis, statistically significant cases of disproportionate assistance being given to grades having a particular type of signal are detected. Only in Area III, however, were the differences large enough to have any operational significance.

--In those grades visited by Resource Teachers, grades having a signal associated with low relative performance did tend to receive a bit more assistance in terms of time spent providing the assistance and of the number of occasions on which assistance was provided, but the differences appear to be due to a few Resource Teachers and a few grades, and the overall differences are not statistically or operationally significant.

--Thus, while there are instances where Resource Teachers were users of signals and disproportionately provided assistance to grades having a particular type of signal, there is no evidence of a systematic or pervasive tailoring of the delivery of Resource Teacher assistance in response to the signals of relative performance.

The results of our analyses are discussed in greater detail in Chapter V of this report. The implications of these findings, for Atlanta and for other large school systems are addressed in the next section.

E. IMPLICATIONS OF WHAT WE HAVE LEARNED

Our work in and with the Atlanta School System has several implications for the operation of large urban school systems:

- Decisions concerning the operation of the school which are made higher up in the administrative structure are generally made without information regarding performance at the classroom level and the variation that exists at this level, whether this information is available or not. Furthermore, there do not appear to be well defined management mechanisms or arrangements which can be utilized by staff or line units in responding to relative performance information.

- In the past, relative performance information was not available in an immediately usable or understandable form for use by school system decision makers. [Some use had been made of absolute performance data.]

- The Urban Institute has provided relative performance information which school officials accepted and praised; however, this information was not generally used in making operational decisions nor did it have a consistent or obvious effect on the activities of the system. Further, management mechanisms for making use of performance information in decisions intended to affect performance in the schools either do not exist or are at cross purposes with each other.

- Further research is necessary to say in which parts of a school system the use of performance information is actually feasible and to design the management techniques for bringing such information to bear on decisions in a systematic way.

Several other implications can be drawn:

- Since signals were praised and accepted by most school officials and actually utilized in a few instances, the continued publication of signals on an in-house basis may, through time, result in the movement towards a management system based on performance information. This is a viable possibility since the costs of production are relatively low.

- At a minimum, however, it would seem necessary at least to develop a unified strategy for various components of the system to use either the signals or other relative performance information.

- In order to have some degree of confidence in achieving better performance management capabilities for large urban school systems, it appears necessary to adopt a two-pronged approach. First, improve the form and accuracy of information which can be created from measures of student performance. Second, develop the management techniques and approaches which will enable school officials to use such information in their efforts to improve student performance throughout the school system.

F. SIGNALS AND SIGNALING

As has been described above (and in more detail in Chapter II), "signals" were used as a mechanism to display the relative performance of individual grades in each elementary school. There are five levels of relative performance which enable a massive amount of achievement data to be displayed in a compact, understandable manner.

The past year's work has demonstrated that school systems could produce signals in-house without large expenditures of resources, if achievement test data and indication of the socioeconomic level of the schools or grades are available in machine-processable form. Documentation for computer programs that have been used to produce the signals and statistical analysis of the data is available as an appendix to this report.

During the last year, Atlanta has modified its computer processing system and now can produce grade level averages for each school. A small change in their subsidized school lunch computer program would allow the calculation of the percent of students receiving subsidized school lunches on the basis that has been used in this system. With this information already available, only the signal preparation programs need be run. Our present program typically can produce signals from this information with one day of analyst time and perhaps $100-$200 of computer time.

For a school system similar in size to Atlanta, which has a data base of individual student raw scores and some measure of socioeconomic status, the production of signals would take two to four weeks following the grading of the tests and would cost on the order of ~ $3,000 (excluding printing costs). First year costs may be slightly higher, but on-going operational costs should be no more than this amount.

The analyses conducted on the signals this year have also demonstrated that:

- The technique used to identify schools performing high or low relative to schools having students from similar socioeconomic conditions can indicate extremes of performance across the full range of socioeconomic conditions existing in the Atlanta student population.
- Grades that are signaled actually do represent extremes of performance. Individual test scores from grades that were signaled were examined in detail to verify that the variation observed for the grade was not just a random event that could statistically be expected to occur in the number of cases detected. In fact, signaled differences are generally statistically significant and cannot be attributed to chance variation.
- Within their error range, the signals appear to be able to identify a recurring phenomenon. The probability of a grade having a certain signal in one year is dependent on the signal it received during the previous year. These conditional probabilities appear to exhibit some stability through time. There were few significant differences in the transition probabilities between academic years 1970-71 and 1971-72 and between the years 1971-72 and 1972-73. If a school system can detect and react to such phenomena, then it has the potential for taking actions aimed at affecting these transitions and achieving higher student performance.

While the analyses during this phase of the study have confirmed the technical soundness and utility of the signals, they have not attempted to exploit fully the information about relative performance that can be extracted from data collected by the school system. Further work is also needed to establish the feasibility of managing to improve performance. Such analyses were not the principal foci of this phase of the study; the majority of our effort was expended on analyzing the existing management of a large school system and the effect of the introduction of performance information in the form of signals. Questions of what types of organizational arrangements are both feasible and desirable and to what extent each could be supported with accurate information about relative performance are the logical next steps of this effort. Sufficient information has already been collected to support most of this work.

G. ORGANIZATION OF THE REPORT

The remainder of this report is divided into four chapters. The reasons underlying the development of signals of relative performance, the techniques used in that development, and properties of the signals are described in Chapter II. Chapter III explains the general setting in which the study took place and the procedures used in the study. In Chapter IV, the operation of the Atlanta School System is discussed and an examination of the management of activities chosen for investigation is presented. Chapter V presents the results of those investigations.

CHAPTER II

SIGNALS OF RELATIVE PERFORMANCE

While the remaining chapters of this report describe the impact of new information on the management of a large school system, this chapter focuses on how and why that new information was developed. The chapter begins with a discussion of the philosophy underlying the focus on relative performance. The technique for generating signals of relative performance is explained. Some of the properties of signals are analyzed in the final section.

A. ASSUMPTIONS UNDERLYING THE DEVELOPMENT OF SIGNALS OF RELATIVE PERFORMANCE[4]

The ultimate aim of this project is to improve the capacity of a large school system to plan and manage its activities in a manner which will make better use of available, limited resources. The technique proposed provides school officials with information about the relative performance of students in schools and grades within those schools throughout the school system. The information on relative school or grade performance is derived from existing data assembled in concise, simple displays which signal how well or badly a school is teaching basic skills.

Why produce signals at all? Of what value are such signals? The development of signals of relative performance has been guided by the belief that school officials need concise, current information in making decisions about either school system policy or day-to-day administration. Every school administrator, principal and teacher is overwhelmed with numbers. The problem has been how to convert those numbers into meaningful indicators of what is happening in a large, complex school system. Too often, the researcher's response has been to create more and different numbers. But data collection in a large school system can be a time-consuming, expensive operation. Unless these new numbers are pertinent to the needs of educational decision-makers, there is no reason to collect the data at all. Therefore, the signals devised in this project were built on existing data, but assembled and displayed in a new format.

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[4] Sections A and B of this chapter are taken largely from Chapter I of The Atlanta Project: Developing Signals of Relative Performance, Bayla F. White, et. al., The Urban Institute, Washington, D.C. 1972.

One of the most important operating assumptions behind the development of the signals has been that officials in large school systems do not know precisely where to look for success or failure. Part of the problem stems from the absence of clearly stated goals and objectives for education, and agreed upon measures of success in meeting those goals. But even in the limited case of a school system's success in teaching basic skills, school officials rarely agree on where to look for specific successes or failures. Data used in any discussion are rarely current. Not every party to a discussion of success or failure uses the same set of assumptions in identifying success or failure. Clearly, in order to know where to look for success or failure in teaching basic skills, there is a need for a single standard of measurement based on the most current data possible.

The authors of this report believe that the measurement should relate to student performance, for it is data on performance that have been missing elements in the management of public school systems. It is technically possible to develop a signaling system that would tell school officials which school libraries have the most books or which schools have the highest pupil/teacher ratios. But, unless these signals are related to how well the students are performing, it is impossible to assess whether more books or more tenured teachers or fewer pupils per teacher are desirable. Therefore, the signaling system developed in this study relies on student performance as its dependent variable. Achievement test data are presently the most readily and universally available indicators of student performance in the area of basic skills development. Many problems exist with the interpretation of achievement test results. This signaling system has, however, been designed to reduce the effects of these problems.

Since the signals are built on achievement test data, what should be the appropriate unit of observation? The signaling system focuses on performance in each grade within a school as the reporting unit, rather than the individual student or groups of students in particular projects. The school--which is composed of a set of grades--is the basic administrative unit of the school system. Although within a school the staff attempts to deal with the needs of individual students, management decisions about the allocation of educational resources inevitably involve the school or the grade within a school as their lowest common denominators.

That signals should indicate relative performance is perhaps the single most important assumption underlying their development. A school system has little control over the background characteristics of its students. Students are the raw material of the educational process. A group of students enters school in the fall and leaves that grade, or perhaps that school, in the spring. It is the job of the school system to structure its educational programs to the characteristics and needs of its students. Educational research has shown that a strong correlation exists between the socioeconomic level of students and their performance on achievement tests, which is used as the dependent variable in generating signals.

Given these facts, it was deemed essential that the signals take into account the characteristics of students in the school system and compare relative performance of schools with similar student populations. Thus, comparisons are not made between the very rich and the very poor. Rather, signals are based on comparisons of similar schools, in which performance is expected, a priori, to be similar. Signals based on extremes of performance in similar schools provide school officials with a much more precise, meaningful technique for pinpointing problems and successes in a large, diverse school system. Once problems or successes based on relative performance are located, then the educator can make more informed decisions about what action should be taken in a given situation.

Finally, because the signals were devised as a management tool, the information they provide is intended primarily for the use of school administrators, from the principals up through the administrative structure of the school system. Although the classroom teacher should also be interested in relative performance, it was felt that signal information should be directed primarily toward other levels of school administration, specifically the principals and central office staffs. The classroom teacher is closest to the process of education and, as the primary dispenser of "education," already has information about how successful the process is. Present indicators of success or failure in the classroom grow progressively weaker as the distance from the classroom increases. Decisione which directly affect the process of education as it occurs in the classroom are often made by personnel several levels removed from the level where instruction takes place. Signals provide a device which enables busy school officials to have a better idea of what is happening in the classroom.

B. THE BENEFITS OF A SYSTEM WHICH SIGNALS EXTREMES OF RELATIVE PERFORMANCE

The potential benefits of information which signals extremes of performance are implicit in the assumptions which underlie its development. Any school system has limited resources, including money, personnel, and time, to be used in providing education to its students, and potentially limitless demands on those resources. The pivotal management question is how to make maximum use of those resources. By giving school officials clues about what is happening in the schools and where, school administrators will have an important tool to use in making informed decisions about how and where to allocate those scarce resources.

While signals can be used to locate extremes of performance, by themselves they do not address the question of why the performance level exists or of what should be done about it. However, the information that signals provide can be used by school officials to diagnose problems and to prescribe appropriate treatments. Ideas for treating problems abound. There is a tendency to apply a particular remedy in shotgun fashion. A system which identifies schools with similar student populations can be extremely useful in deciding where to apply a remedy and in evaluating its success. It is important to remember that signals call attention to success as well as failure. Unfortunately, educators know as little about what causes success as they do about what accounts for failure. Attempts to account for apparently successful schools or grades can help school officials narrow the range of possible remedies for problems, thereby enhancing the likelihood of success for the remedy chosen.

The signals flag only extremes of relative performance. The definition of what constitutes extreme performance has been established so as to eliminate many of the arguments about the accuracy of achievement tests in measuring individual student achievement. The signals, by design, flag only those cases in which relative performance is extremely high or low. Consequently, the numbers of signaled cases are more compatible with the limited resources available to affect those cases.

Information from the signals is potentially most useful in making decisions which have a direct impact on the classroom or grade because it is from the grade that the signals derive. The pattern of signals from a particular grade and subject area, such as 4th-grade reading, can provide important clues for curriculum development activities in a school system. The pattern of performance in a particular school can be used in making decisions concerning staffing needs for that school. Patterns in achievement in particular types of schools can be used to identify teacher training needs or to channel teachers to in-service training opportunities. Thus, in the short run, signals of extremes of relative performance can be an important ingredient in decisions about how to target flexible resources within the school system.

In the longer run, the signals and the curves can be used to focus attention on important policy questions which confront school boards and top decision-makers within a school system. The signaling system does not detect net changes over time in the performance of the Atlanta School System as a whole. It provides a tool for use in identifying individual situations that produce extremes in performance in selected grades. The shape and level of the fitted curves, however, raise the questions of overall system performance and of which types of schools to help. One policy response might be to concentrate efforts on improving the performance of every school in which relative performance is extremely low. This might mean putting effort into a rich school where performance is at or above the national norm, but below the performance level of similar schools in the system. Or, a policy decision might be made to focus attention on the schools where absolute performance is lowest, regardless of the fact that some of those schools may have high levels of relative performance. Signals do not tell education policy makers which course of action is better. But the signaling system will help frame policy issues more clearly, and thus should raise the level of debate about the direction of public education.

C. THE DERIVATION OF SIGNALS OF RELATIVE PERFORMANCE

The information--signals--distributed to Atlanta officials has been designed to enable school personnel and administrators to identify grades at individual schools where the students' performance is considerably better or worse than might be expected of students in similar schools. Performance is measured by mean (average) level on the achievement test batteries administered to Atlanta students in the spring of each year. Schools are identified as similar based on the level of student participation in the free and reduced-priced lunch program.

In April of each year, Atlanta administers a battery of standardized achievement tests to every student in Grades 1-7. Data on mean (average) achievement for the three years 1971, 1972 and 1973 have been used in the production of signals. For the years 1971 and 1972, signals were based on results of the Metropolitan Achievement Test batteries; for the year 1973, signals are based on results of the Iowa Test of Basic Skills. After consultation with Atlanta officials, only results from the reading and arithmetic problem solving subtests[5] were used in the initial production of signals.

The signals identify extremes of performance relative to the economic composition of a school, as measured by participation in the free and reduced-price lunch program. Although educational research indicates that the socioeconomic background of students accounts for much of the observed variation in achievement, most school systems, including Atlanta, do not keep accurate or current data on the socioeconomic status of their students. However, participation in the federally subsidized school lunch program can be used as a surrogate for a school's economic composition. Since entry into the free and reduced-price lunch program is determined by family income and size, the percent of students who participate in this program provides an indicator of the percentage of poor students at each school. This variable alone accounts for 50 to 80 percent of the variation in average scores in each grade level, even though the variable represents the average participation of an entire school rather than an individual grade.

To produce signals of relative performance, averages by grade on one reading and one arithmetic subtest of the achievement test battery for a given year were plotted against the amount of participation in the free and reduced-price lunch program at each school. The result of this effort is one scattergram for each grade and each subtest (7 grades x 2 subtests = 14 scattergrams for each year). Figure II-1 illustrates the relationship which exists between these two variables. The horizontal axis of each scattergram represents the percent of students at any school participating

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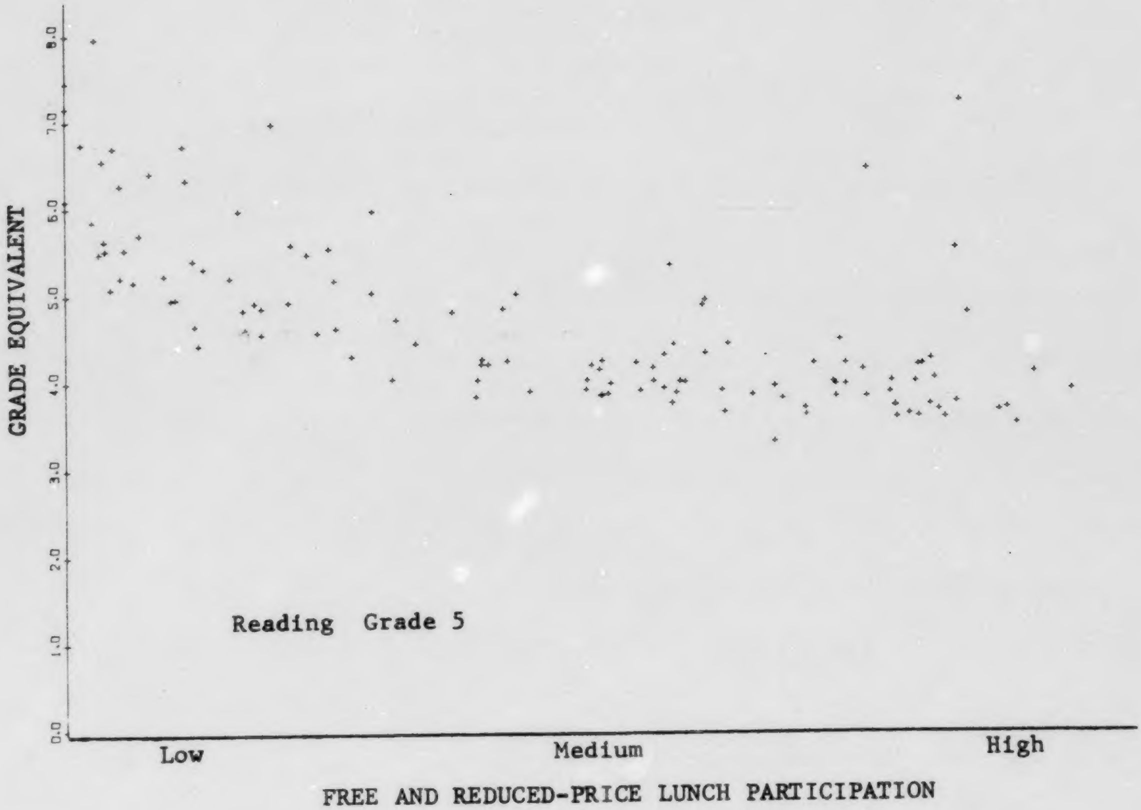
[5] It is possible to produce signals using the results of any achievement subtest.

Figure II-1

Relationship Between Achievement and Subsidized Lunch Participation



in the subsidized lunch program. The right end of the scattergram is labelled "High" participation, indicating those schools which enroll more students from poorer economic backgrounds. Each mark (+) on the scattergram in Figure II-1 represents the grade equivalent average for all students who took the reading subtest in the 5th grade at a particular school, plotted against free and reduced-price lunch participation for that entire school.

Atlanta administers achievement tests in the seventh month (April) of each school year. The national norm for 5th graders who took the test at that time is defined by the test manufacturers as 5.7. It is apparent when looking at the scattergram that most 5th grade average scores in Atlanta elementary schools fall below the national norm. The signals developed in this project do not compare individual school averages with the national norm; rather, the signals are derived from comparisons of schools in Atlanta which have student populations of similar economic composition.

The process of making relative comparisons has been made easier by fitting a curve labelled C through the data points.[6] Figure II-2 below shows the resulting curve for 5th grade reading in one year. Any point on the curve may be thought of as the norm for schools which fall above or below that point. Figure II-2 also includes four other curves, two above (A and B) and two below (D and E) that basic fitted curve. These four curves represent boundaries beyond which the average performance of students in that grade is considerably above or below the level of average performance that might be expected of students in similar schools. Boundaries have been designed so that only clear cases of extremely high or low relative performance are signaled. Thus, only about 10-15 percent of the grades in all schools are signaled, as cases of extreme performance, in any one year.

Five categories of signals result from the approach illustrated in Figure II-2. When the level of relative performance falls within the shaded range shown on Figure II-2, the grade is not considered an extreme case and receives no signal. A grade in which the level of performance falls between the curves labelled A and B is signaled with a blue semi-circle. When the level of performance falls on or above curve A, then the grade is signaled with a full blue circle. When the performance of a particular grade is relatively high, but the absolute level of performance is below the national norm, then the symbol ▬ is placed in the appropriate full blue or half-blue

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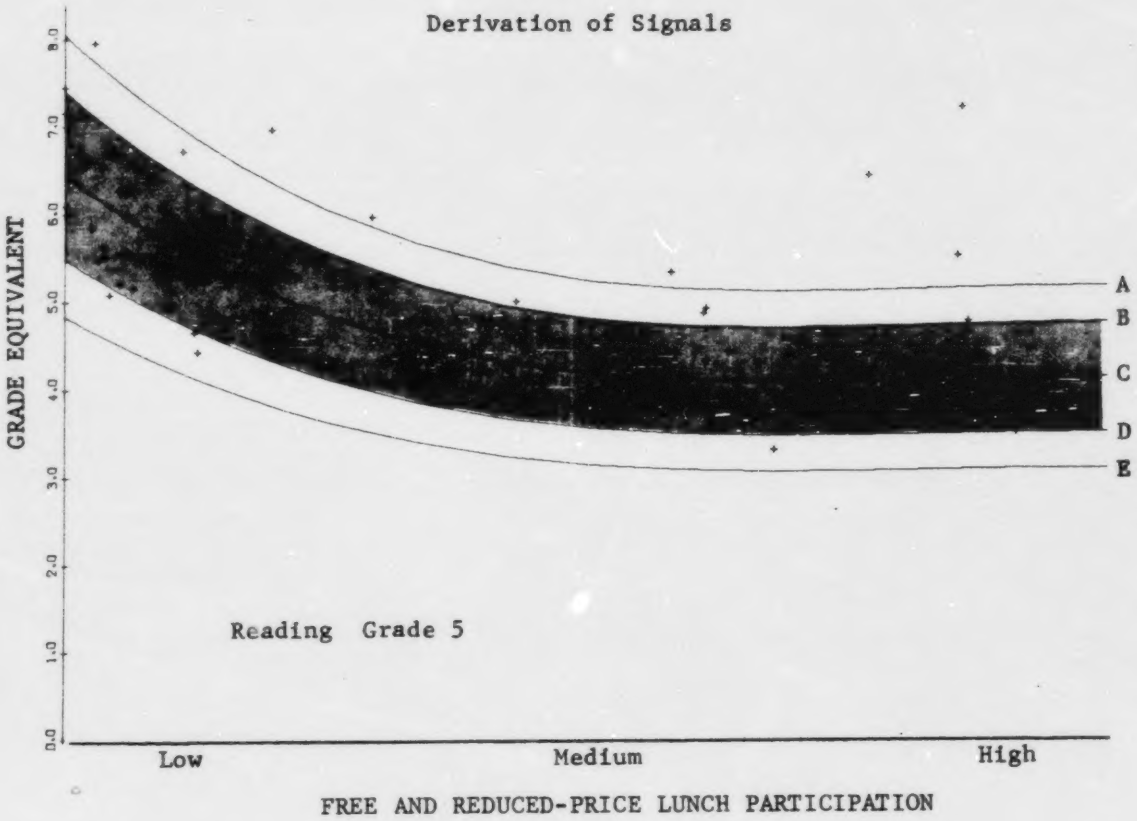
[6] The curve used here is a least squares fit. Documentation for the production of signals may be found in the Appendix.

Figure II-2

Derivation of Signals



signal.[7] When the level of performance falls between curves D and E, then the grade is signaled with a red semi-circle. When the level of performance falls on or below curve E, then the grade is signaled with a full red circle.

Since only performance among similar schools is being compared, two 5th grades with the same absolute grade equivalent average may receive different signals. A 5th grade which has a grade equivalent average of 4.9 in a school with many poor students might be considerably above the point of the performance curve for schools similar in terms of economic level; it would therefore receive a half-blue signal. However, a 5th grade which has the same grade equivalent average of 4.9 in a school with very few poor students might be considerably below the performance curve for similar schools and it would receive a half-red signal.

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[7] This distinction between relative and absolute performance was made at the suggestion of former Superintendent John W. Letson.

The signals for each elementary, primary and middle school in Atlanta were organized into compact displays similar to the ones which appear on the following page. Figure II-3 illustrates the initial format for displaying signals for an individual school which was distributed to Atlanta in November 1972. The format in Figure II-4 presents an additional year of information for the same school and was distributed to Atlanta officials in August 1973, at the close of this project. Each set of school signals was accompanied by data on the mean achievement score for each grade, subtest and year.

Presentation of data in this format enables the user to see quickly the relative status of performance at a school. Several important facts about performance in Atlanta's schools emerge from this approach to the use of achievement test data. First, most grades in a school are not signaled because the signaling system locates only extremes of performance, conservatively defined. Second, in three years of signals for approximately 130 schools per year, there is not a single school in which every grade is signaled in both reading and math. Moreover, the pattern of relative performance within any school usually differs from one subtest to the other; the relative performance of students within the same grade on different subtests is also markedly dissimilar.

Reading down a single column of one grid pictures the relative performance of all grades in the school in reading or arithmetic at one point in time. Reading across a row of one grid pictures the relative performance of different groups of students in the same grade over time. For a school in which student mobility is low, reading down a diagonal compares the relative performance of the same group of students over time.

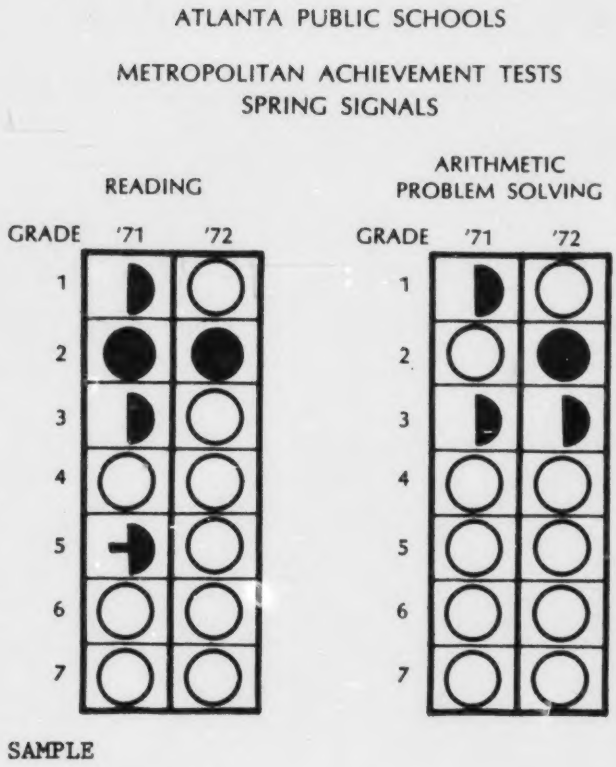
ATLANTA PUBLIC SCHOOLS
METROPOLITAN ACHIEVEMENT TESTS
SPRING SIGNALS
READING
ARITHMETIC PROBLEM SOLVING
GRADE
'71
'72
1
2
3
4
5
6
7
SAMPLE

FIGURE II-3

SIGNALS DISTRIBUTED IN

NOVEMBER 1972

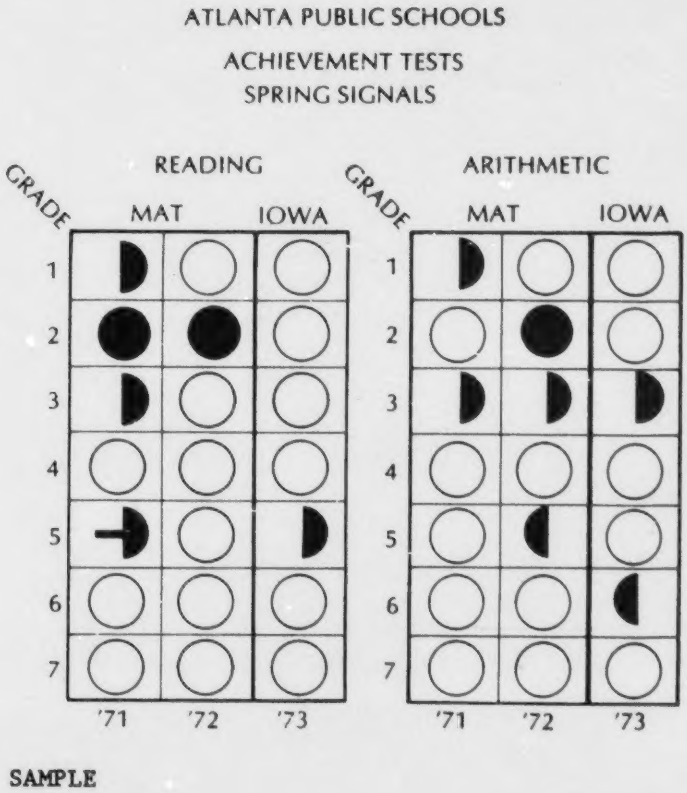
ATLANTA PUBLIC SCHOOLS
ACHIEVEMENT TESTS
SPRING SIGNALS
READING
ARITHMETIC
GRADE
MAT
IOWA
1
2
3
4
5
6
7
'71
'72
'73
SAMPLE

FIGURE II-4

SIGNALS DISTRIBUTED IN

AUGUST 1973

Another display of signals was prepared for use primarily by staff at the Area Office level. The reading and arithmetic signals for every school in an Area for one year were arrayed on a single sheet of paper. Staff in the Area Office and elsewhere throughout the central administration of the school system received a set of Area sheets for each year since 1971. This method of displaying signals enables an administrator to see at a glance the relative performance of every grade in all schools (as many as 30) in a geographic area.

The next section of this chapter describes in more detail some of the properties of signals.

D. PROPERTIES OF SIGNALS

Now that the technique for the production of signals has been described, some questions about the properties of signals can be examined. Signals have been produced for three years and will be used to examine the following questions:

- What proportion of grades are signaled as cases of extreme relative performance in each of the three years?
- Are the extremes of performance which are signaled of significant magnitude to be considered extreme performance?
- How does the assignment of signals from year to year compare with that which would be expected from chance alone?
- Was the observed pattern of signals produced in 1973 different from that expected on the basis of signals from previous years?

As the material which follows will show, signals do indeed indicate cases of extreme performance, even when measurement error is taken into account. The *pattern of signals is* measurably different from the pattern which would have been obtained through chance alone. Moreover, for Grades 3 through 7, the pattern of signal change from year to year did not alter markedly after the signals were introduced into the Atlanta system.

1. THE ANALYSIS FRAMEWORK

In order to consider the questions posed above, an analysis framework was adopted which produced a consistent set of data from year to year. A total of 115 schools have been included in the analysis set. The set includes only elementary schools which remained open (did not open or close) over the three-year period in question. The basic element selected for analysis is the grade level[8] (i.e., Grades 1, 2, 3, 4, 5, 6 and 7) at each elementary school. The analysis framework thus consists of 115 schools, each of which in general has seven grades for a total of 115 x 7 = 805 cells.[9] Since a few schools do not contain all seven grades, tabulations will generally be based on less than the maximum number of cells.

Figure II-5 illustrates the analysis framework. The shaded row (School 004) indicates the seven grade levels within a single school. The shaded square is the 4th grade at School 002. Each column represents a single grade level for the entire analysis set. Each cell in the figure represents a grade level at a particular school. This figure indicates the finest level of detail considered, the level to which a particular signal is assigned for high (blue or half blue), average (neutral), or low (red or half red) relative performance. For each cell, signals are created for the reading and the arithmetic problem solving subtests in the spring of each year.

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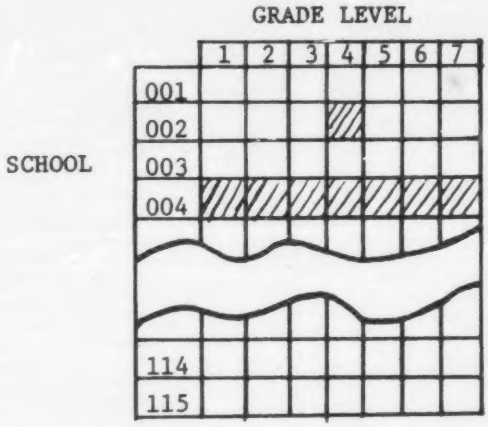
[8] Machine grading of the test results from Grades 1 and 2 for 1973 were subcontracted by Atlanta to the test publishers. Due to some confusion on format and marking, several thousand test results were not graded, rendering these two grades unusable for analysis in 1973. While there is some chance of recovering these data for further use, they were not available for use in this report. Because of this, all data have been converted for this chapter to consider only Grades 3, 4, 5, 6 and 7. Data for Grades 1 and 2 from 1970-71 and 1971-72 have already been processed at the Institute and are available.

[9] A cell is a particular grade level at a particular school. Several schools in the analysis set no longer have 6th or 7th grades; they have been transferred to middle schools. Occasionally, test data are missing for a cell, even though the grade did exist. When considering only Grades 3, 4, 5, 6 and 7, the maximum number of cells in the analysis set is 575.

Figure II-5

The Analysis Framework



2. THE PROPORTION OF GRADES SIGNALED

This section addresses the question of what proportion of grades are signaled as cases of extreme relative performance in each of the three years. The data presented in this section are based only on Grades 3-7, because of the scoring problems encountered in April 1973 for Grades 1 and 2. In each year since April 1971, a signal of relative performance in reading and in arithmetic problem solving has been produced for every grade 3-7 in the 115 schools in the analysis set.

A primary purpose of the signals was to help school officials locate cases of extreme relative performance. The limits originally used in developing the signals were designed to flag only about 15 percent of the cells as extreme. It was felt that school officials could only respond to a minority of cases and that attention should be focused on the grades which were known to show large variation from some "norm."

The signaling boundaries were selected in order to signal the grades at schools lying furthest from the curve fitted through the mean scores of all schools for each grade and subtest. Percentages were used because inspection had shown that there was generally more dispersion of scores around the curve for non-poor schools (where the absolute score was larger) and generally lower dispersion around the curve for poorer schools (where the absolute score was smaller). Thus, the use of a percentage boundary tended to equalize the numbers signaled from various economic categories.

Table II-1 shows how signals were distributed in each of the three years, for reading and arithmetic problem solving. "Blue" refers to either full or half-blue signals; "red" refers to either full or half-red signals. "Neutral" means the level of performance in the grade was not considered extreme and received no signal.

TABLE II-1

DISTRIBUTION OF SIGNALS FOR GRADES 3-7

YEAR	READING							ARITHMETIC PROBLEM SOLVING						
	Blue		Neutral		Red		Total	Blue		Neutral		Red		Total
	#	%	#	%	#	%	#	#	%	#	%	#	%	#
1971	46	8.2	480	85.7	34	6.1	560	24	4.3	518	92.5	18	3.2	560
1972	57	10.4	454	83.1	35	6.4	546	33	6.1	500	91.7	12	2.2	545
1973	56	10.4	453	84.3	28	5.7	537	36	6.7	493	91.8	8	1.5	537

Of the cells signaled blue in reading, seven received blue signals in each of the three years. Five additional grade cells received blue signals in reading in both 1971 and 1972, but not in 1973; seven other cells received blue signals in 1972 and 1973, but not in 1971. No grade cell in Atlanta received a red signal in reading three years in a row. Six grade cells received red signals in 1971 and 1972; seven other grade cells were red in 1972 and 1973 in reading.

Table II-2 below provides data on the amount of overlap occuring between reading and arithmetic signals. Each grade receives two signals: one in reading and one in arithmetic. Fewer grades receive signals in arithmetic than in reading.

TABLE II-2

OVERLAP OF READING AND ARITHMETIC SIGNALS
FOR GRADES 3-7

	NO. OF GRADES WITH BLUE SIGNALS IN:			NO. OF GRADES WITH RED SIGNALS IN:		
YEAR	Reading	Arithmetic	Reading and Arithmetic	Reading	Arithmetic	Reading and Arithmetic
1971	46	24	20	34	18	11
1972	57	33	19	35	12	7
1973	56	36	24	28	8	5

Data in the table show that a grade which receives a blue or a red signal in arithmetic is likely to receive the same kind of signal in reading about two-thirds of the time. There are, of course, many grades signaled (red or blue) for reading that do not receive the same signal for arithmetic. Further examination of actual scores would be necessary to reveal the extent of differences in relative performance between reading and arithmetic.

3. HOW EXTREME IS THE PERFORMANCE SIGNALED?

One way to deal with the question of how extreme is the performance which is signaled (either red or blue) is to consider how far away from the basic curve each red or blue signal lies. An examination of some actual signaled cells will be used to illustrate what has been learned about how far signaled cells lie from the basic fitted curve.

In the process of fitting a curve through the achievement data for each grade, each year and each subtest, the distribution of the distance that the average scores fell from each fitted curve was collected. The standard error (σ) value for this dispersion of scores was obtained in each case. For example, the distance of the average score of all children in each red signaled grade in reading in 1972 from the fitted curve or "norm" for that grade, subtest, and year was measured. The variation of the average of a grade from the curve (expressed in grade equivalent units) was divided by the standard error (σ) value for all points about that curve to determine how far away from the curve the extreme cases tended to fall. The results showed that, of 35 red reading signals for 1972, 10 were more than 2σ below the curve. An additional 24 were between 1σ and 2σ below the curve. The remaining signal was 0.95σ below the curve; this nearest case came from a lower grade (3rd) at a relatively poor school (100 percent free and reduced-price lunch participation). These results appear to hold for the other sets of signals. For the signals based on arithmetic problem solving, the limits used to produce the signals turned out to be even more conservative. In arithmetic, fewer cases were signaled, and those that did receive either a blue or a red signal were located even further from the curve than reading signals.

In absolute grade equivalent terms, the standard error of the distribution of scores around the curves in 1972 ranged from 0.69 grade equivalent in 7th grade reading to 0.28 grade equivalent in 3rd grade problem solving. Percent boundaries were used in signaling because dispersion of the averages about the curve is not uniformly distributed and tends to decrease as percent free and reduced-price lunch participation increases. As an estimate of an average distance used in signaling, the 15 percent signaling boundaries are 0.9 grade equivalent units from a curve at a grade equivalent score of 6.0 and 0.45 grade equivalent units at a grade equivalent score of 3.0.

The next question about the signaled cells is how accurately were their average scores measured. That is, even though the boundaries were sufficiently conservative, what effect did measurement error have on the signal assigned to a particular cell? The standard error of measurement for a single student on the achievement tests used by Atlanta was approximately 0.4 grade equivalent in 3rd grade and 0.6 grade equivalent in 7th grade.[10] The average size of a grade ranges from 50-60 children. This suggests that the average on the grade is measured within 0.06 (or $0.4/\sqrt{50}$) to perhaps 0.08 (or $0.6/\sqrt{50}$) grade equivalent at one standard error. It is doubtful that this small an error occurs in practice; however, if an error of this range did occur, it would not disturb the estimate that most of the cases signaled are extreme. It would simply mean that on remeasurement some alternative extreme cases might be signaled near the boundaries.

The discussion of measurement error will become more important when transitions of the signals from year-to-year are considered. Up to this point, the discussion has considered only whether extreme cases are being signaled. When only signals for one year are considered, it is less important that some legitimately extreme performers are not signaled as long as those signaled are, in fact extreme. When signal changes from year-to-year are considered, it is of interest how many cells have average values near enough the boundary between extreme performance (red or blue) and average performance (neutral) that they could switch signals simply through measurement error.

In the case of signal transitions from year to year, a quick test has been made by taking a census (through visual inspection) of those averages which fell near the inner boundary lines in 1972 reading. To estimate both a best and worst case, a count was made of the total number of cases (Grades 3, 4, 5, 6 and 7) falling within ± 0.06 grade equivalent and ± 0.15 grade equivalent of the inner boundary lines. The results are given in Table II-3 below.

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[10] See, for instance, Durast *et al.*, *Teacher's Handbook, Metropolitan Achievement Tests*, Harcourt, Brace and Jovanovich, New York, 1971.

TABLE II-3

TABULATION OF CASES NEAR THE BOUNDARIES IN
1972 READING FOR GRADES 3 - 7

BOUNDARY	+0.06	+0.15	-0.06	-0.15
Blue/Neutral Boundary	10	21	10	26
Red/Neutral Boundary	11	44	8	17

Consider first the red boundary. There are eight red signaled grades within 0.06 below the boundary and 17 red signaled grades (including the previous 8) within 0.15 below the boundary, out of a total of 35 red signaled cells. If we postulated as a worst case that the 17 signals represented the 1σ range of measured value for a larger set of signals that all lay on the boundary, then the total set would contain approximately 51 signals. [This assumes a normal distribution in which a single 1σ contains ~17 signals and the total set, therefore, contains ~51 signals.] Approximately one-half of these, or about 26, would be expected to fall in the red signal range. One-half of the 26 (again on average) might be expected to change from red to neutral simply due to measurement error in the next cycle of measurements. That would mean that 13 of the red signals become neutral simply due to remeasurement. While they would still be relatively extreme, they would not be signaled red in the remeasurement.

Clearly, both the error range and assumptions used have been made extreme in this case to show how many of the 35 red signaled cells might be signaled neutral during a remeasurement. Even in this worst case, the probability is 13/35 (or 0.37) that a red signal would become neutral.

If the indicated range of 0.06 had been used as 1σ, and the same procedure followed, the number of potential switches would have been 6 of 35 or 17 percent. Using the same assumptions for blue, 7.5 (13 percent) to 16 (28 percent) of the 57 blue signals would become neutral in a remeasurement. These calculations will be referred to again when transition probabilities are discussed later in the chapter.

4. IS THE ASSIGNMENT OF SIGNALS DUE TO CHANCE?

Since changes are always being made within a school system, it is extremely difficult to predict how much stability can be expected in the signals from year to year. School officials could provide no yardstick by which to predict the effects on relative performance of changes in teachers, shifts in student populations, and the continuous modification of the instructional program. If all such changes were beneficial, then increasing stability in blue signals and less stability in red signals (within the limits of measurement error) might be predicted. The analyses conducted to date indicate that most actions by school officials produce diverse effects.

It is important for the reader to realize that this is quite different from saying that no action by school officials makes a difference. It may be that present constraints and lack of systematic purposefulness create effects which cancel out. Consider the hypothetical and oversimplified example of a teacher-caused red signal. Suppose that the poor teacher is replaced with an excellent one and, in the next school year, the signal for that grade becomes neutral or blue. The poor teacher is not likely to have left the school system. Instead, the poor teacher is likely to have been reassigned to another school. This transaction could result in the creation of a new red signal (all other things being equal). Without better attribution or more detailed analysis, the lack of systematic improvement throughout the school system would lead one to conclude (as our early examinations indicate) that teacher transfer does not lead to improvement. The point is that this lack of effect in the statistics does not necessarily mean that the teachers make no difference. It can as easily mean that the control mechanism works in such a way that no net change is produced.

The allocation of signals from one year to the next will now be examined to determine if they could have been assigned by chance alone. Most statistical tests address the question of whether the assignment of signals to cells is significantly different from a chance distribution. The data which follow address the following hypothesis:

- The signals in 1972 were assigned to cells at random and were not conditioned upon the signal given to that cell in 1971.

Table II-4 below contains a matrix which shows the distribution of reading signals for 1972 based on the reading signal received in 1971.

TABLE II-4

ACTUAL SIGNAL OCCURRENCES FOR
GRADES 1-7 IN READING, 1971 AND 1972

			1972				
	SIGNAL:	771	Blue	Half Blue	Neutral	Half Red	Red
			32	54	624	53	8
1971	Blue	15	3	3	9	0	0
	Half Blue	62	8	9	45	0	0
	Neutral	633	19	40	527	42	5
	Half Red	42	2	2	29	8	1
	Red	19	0	0	14	3	2

This matrix was divided into zones for initial testing of the hypothesis as follows:

TABLE II-5
ZONE DEFINITION

1972

	SIGNAL:	771	Blue	Half Blue	Neutral	Half Red	Red
			32	54	624	53	8
	Blue	15	A		B	C	
	Half Blue	62					
1971	Neutral	633			E		
	Half Red	42	D		F	G	
	Red	19					

KEY: A - Blue both years
B - Blue in '71, Neutral in '72
C - Blue in '71, Red in '72
D - Red in '71, Blue in '72
E - Neutral both years
F - Red in '71, Neutral in '72
G - Red both years

For the hypothesis stated above to be correct, the signals in 1972 should be distributed proportionately among cells and any particular grouping of cells (such as the zones above) should not affect this.[11]

Consider Zone A, which is composed of cells signaled either full or half-blue both years. There were 77 such cells in 1971. If the signals were randomly and independently assigned in 1972, then the probability of any cell receiving a blue signal is $\frac{32 + 54}{771} = p = 0.112$. If the binomial distribution is used as an approximation, then the expected number of blue cells in Zone A is $\mu = np = 77\ (0.112) = 8.6$ and the standard deviation (σ) is $\sigma = \sqrt{np(1-p)} = \sqrt{77(0.112)\ (0.888)} = 2.8$. That is, if the hypothesis were true (and two possibilities in 1972 are considered; blue or not blue for the cells that were blue in 1971) then we would expect to find in Zone A about 8.6 blue signals in 1972 with a standard deviation of 2.8. In fact, there are 23 blue cells in 1972--or about five standard deviations from the mean.

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[11] The zones "neutral to blue" and "neutral to red" have not been carried along in this example. There are many different causes of these transitions and they generally occur at or near a chance rate.

The results of similar analyses for the remaining zones are presented in Table II-6 (for reading) and Table II-7 (for arithmetic). The probabilities for each case are not shown. Instead the results are presented in units of standard deviations from the mean. The upper portion of each table displays the predicted mean (μ), standard deviation (σ) and the observed mean ($\hat{\mu}$) for each zone. The lower portion of each table gives the value of Z (where Z = $\frac{\hat{\mu}-\mu}{\sigma}$) for each zone. Where the normal is a good approximation, a unit normal value of Z that is a little larger than 1.6 would be representative of a one-tailed test at the .05 level of significance; for a two-tailed test, the .05 level would be 1.96. The diagonal running from upper left to lower right represents the tendency for the cell representing the same grade to have the same signal in a succeeding year. The other diagonal represents the tendency of the signals to shift to the other extreme (e.g., red to blue, blue to red).

On the basis of the value summarized in Tables II-6 and II-7, the hypothesis that signals in 1972 were assigned at random can be rejected in many of the zones without adjusting for other descriptive variables such as student mobility or staff changes. In zones A and G, the high Z values indicate that assignments of signals in 1972 were not random but were dependent upon the signal received in the preceding year. The positive sign on Z indicates that more signals were assigned in 1972 to these cells (i.e., more remained high or low) than would have been expected by chance. Negative signs indicate that fewer occurrences existed than would have been dictated by chance. When examining negative Z's, the reader will also need to examine μ and σ, since in some cases a nearby boundary (0 or no cases) leads to a value for Z that is not as large as might have been expected.

TABLE II-6

VALUES FOR THE PREDICTED MEAN, THE OBSERVED MEAN, THE STANDARD DEVIATION, AND Z-VALUES, IN READING, 1971 AND 1972

a. μ σ $\hat{\mu}$

1972

	SIGNAL	BLUE	HALF BLUE	NEUTRAL	HALF RED	RED	TOTAL
	B	$\mu = 8.6$ $\sigma = 2.8$ $\hat{\mu} = 23$		$\mu = 62.4$ $\sigma = 3.5$ $\hat{\mu} = 54$	$\mu = 6.1$ $\sigma = 2.4$ $\hat{\mu} = 0$		77
	HB						
1971	N			$\mu = 512.3$ $\sigma = 9.9$ $\hat{\mu} = 527$			633
	HR	$\mu = 6.8$ $\sigma = 2.5$ $\hat{\mu} = 4$		$\mu = 49.3$ $\sigma = 3.1$ $\hat{\mu} = 43$	$\mu = 4.8$ $\sigma = 2.1$ $\hat{\mu} = 14$		61
	R						
	TOTAL	86		624	61		771

b. Z-Values:

1972

	SIGNAL	BLUE	HALF BLUE	NEUTRAL	HALF RED	RED	TOTAL
	B	$z = 5.1$		$z = -2.4$	$z = -2.5$		77
	HB						
1971	N			$z = 1.5$			633
	HR	$z = -1.1$		$z = -1.9$	$z = 4.4$		61
	R						
	TOTAL	86		624	61		771

TABLE II-7

VALUES FOR THE PREDICTED MEAN, THE OBSERVED MEAN, THE STANDARD DEVIATION, AND Z-VALUES, IN ARITHMETIC, 1971 AND 1972

a. μ σ $\hat{\mu}$

1972

	SIGNAL	BLUE	HALF BLUE	NEUTRAL	HALF RED	RED	TOTAL
	B	$\mu = 4.9$ $\sigma = 2.1$ $\hat{\mu} = 27$		$\mu = 49.8$ $\sigma = 2.7$ $\hat{\mu} = 29$	$\mu = 3.2$ $\sigma = 1.7$ $\hat{\mu} = 2$		58
	HB						
1971	N			$\mu = 566.5$ $\sigma = 9.0$ $\hat{\mu} = 600$			660
	HR	$\mu = 4.4$ $\sigma = 2.0$ $\hat{\mu} = 0$		$\mu = 44.6$ $\sigma = 2.5$ $\hat{\mu} = 32$	$\mu = 2.9$ $\sigma = 1.7$ $\hat{\mu} = 20$		52
	R						
	TOTAL	66		661	43		770

b. Z-Values:

1972

	SIGNAL	BLUE	HALF BLUE	NEUTRAL	HALF RED	RED	TOTAL
	B	$z = 10.5$		$z = -7.7$	$z = -0.7$		58
	HB						
1971	N			$z = 3.7$			660
	HR	$z = -2.2$		$z = -5.2$	$z = 10.0$		52
	R						
	TOTAL	66		661	43		770

Many cells do change signals from year to year. This can come from a combination of effects from teacher transfer, pupil transfer, error of measurement, change of teaching techniques or curriculum, etc. For instance, it was observed earlier that changes of perhaps one-fourth of the signals might come about through measurement error. In addition, a rather random method of managing changes in the educational program and faculty may produce apparently random results when gross statistical techniques are used. Even with these present, this analysis indicates that there is a nonrandom mechanism at work selecting signals. That is, knowing the signal of a grade in 1971 definitely gives probabilistic information about the signal received by the grade in 1972. Therefore, the hypothesis of chance assignment is rejected.

5. DID TRANSITION BEHAVIOR CHANGE THIS YEAR?

As stated before, changes in the level of performance from one year to the next are to be expected in a school system. Students change, as do the curriculum, teaching staff, and/or materials used in a grade at a school. Moreover, the school system may already be taking steps to alleviate or replicate conditions which give rise to signals. This section addresses the patterns of allocation of signals of relative performance for 1971, 1972, and 1973 and how the transitions from year to year differ. Since data also were available characterizing the changes that occurred between 1971 and 1972, it was possible to compare the transitions in performance signals made at grade levels at individual schools from spring 1971 to spring 1972 with the transitions made from spring 1972 to spring 1973 (the period during which signals were introduced).

Table II-8 presents data describing the transitions of signals in reading for Grades 3, 4, 5, 6 and 7 of the 115-school analysis set. The table includes all grades that were present and signaled in both years (544 grades or cells). To understand Table II-8, think of the signals as being distributed to cells of grade levels at schools by the signaling technique for 1971. Table II-8 shows that in 1971--of the cells signaled in both years (544)--44 cells received blue signals (full blue or half blue), 467 cells received neutral performance signals (no color), and 33 cells received red signals (full or half red). Of those same 544 cells in 1972, 57 cells were signaled blue, 452 cells were neutral, and 35 cells were signaled red.

TABLE II-8

ASSIGNMENT OF READING SIGNALS, 1971 TO 1972

		1972			
	SIGNAL:	Blue	Neutral	Red	Total
1971	Blue	12	32	0	44
	Neutral	44	394	29	467
	Red	1	26	6	33
	Total	57	452	35	544

Observe that of the 44 cells that were blue in 1971 (top row of data), 12 remained blue in 1972, 32 received neutral signals, and no cell became red in 1972. Table II-9 displays the data converted into a probability of transition matrix for reading, from 1971 to 1972. The matrix shows the probability of making any of the possible transitions from one signal category to another, based on the data from 1971 and 1972. For instance, the probability that a blue in 1971 would remain blue in 1972 was 0.27.

TABLE II-9

TRANSITION PROBABILITIES FOR READING (GRADES 3-7), 1971 TO 1972

	SIGNAL:	Blue	Neutral	Red
1971	Blue	.27	.73	0
	Neutral	.09	.85	.06
	Red	.03	.79	.18

Consider this matrix as providing the basis for estimating the transitions which might be expected between signals in 1972 and those which occurred in 1973. For instance, consider the set containing the 57 cells that were blue in 1972. If these 1971-72 transition probabilities were to apply in 1972-73, then the following distribution of signals would be expected for those 57 cells:

57 x (0.27) = 15.4 would remain blue,

57 x (0.73) = 41.6 would become neutral, and

57 x (0) = 0.0 would become red.

The actual numbers of signals for 1973 were 14 blue, 42 neutral, and one red. These numbers differ by less than 1σ from those expected[12] and demonstrate that the 1972-73 transitions of blue signals are predictable using the 1971-72 transition probabilities for blue signals. The implication of this finding is that there was no sharp change in the transition behavior of blue signaled cells from 1972 to 1973. With these actual numbers, a simple χ^2 test with one degree of freedom using the actual number yields the following value:

$$\chi^2 = \frac{(14-15.4)^2}{15.4} + \frac{(43-41.6)^2}{41.6} \sim 0.17$$

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[12] Where σ is defined as $\sqrt{np\,(1-p)} = \sqrt{57(.27)\,(.73)} \sim 3.3$.

indicating again that the observed data in 1973 are distributed about as would have been predicted from the 1971-72 transition probabilities.

This kind of examination was extended to cover the transition in signals for reading between April 1972 and April 1973. Those cells from the 1972 signal set present in the 1973 signal set must be used in developing the expected transitions from 1972 to 1973. A total of 534 cells[13] were present in both April 1972 and in April 1973. The division of the 534 cells (present in 1972 and 1973) into signal categories in 1972 was as follows: 57 were blue in 1972, 443 were neutral in 1972 and 34 were red in 1972. The total of 534 cells is slightly lower than the total in the 1971-72 transition set because some 6th and 7th grades were transferred to middle schools in 1973 and, hence, were excluded from the analysis set. Applying the transition probability matrix to these data, the transition table for 1972/1973 would be expected to resemble Table II-10. [The projections have been rounded to whole numbers for display here.]

TABLE II-10

PREDICTED TRANSITIONS OF READING SIGNALS IN 1973, BASED UPON 1972 DATA

	SIGNAL:	Blue	Neutral	Red	Total
1972	Blue	15	42	0	57
	Neutral	40	376	27	443
	Red	1	27	6	34
	Total	56	445	33	534

Table II-11 then compares the observed transition counts with those predicted for 1972-73. The largest variation is in the case of neutral to red [there are fewer reds observed than were predicted]; this is not statistically significant. For the school system as a whole, therefore, there is no indication of a large change in transition behavior in reading between the two periods 1971-72 and 1972-73.

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[13] Data for Grades 1 and 2 were not yet available for 1973 and therefore the number of cells is reduced to 534.

TABLE II-11

COMPARISON OF PREDICTED/OBSERVED
TRANSITIONS OF READING SIGNALS
BETWEEN 1972 AND 1973

	SIGNAL:	Blue	Neutral	Red
	Blue	15/14	42/42	0/1
1972	Neutral	40/40	376/383	27/20
	Red	1/1	27/26	6/7

A similar examination can be made for arithmetic problem solving signal transitions. Here, lower numbers of red and blue signals make the results a little harder to rely on statistically.

Table II-12 presents outcomes for arithmetic similar to that previously reviewed for reading. The probability of transition for the 1971-72 case has been used to predict outcomes in 1973. The predicted distribution (rounded to whole numbers) is shown in Table II-12.

TABLE II-12

PREDICTED TRANSITIONS OF ARITHMETIC SIGNALS
IN 1973, BASED UPON 1972 DATA

	SIGNAL:	Blue	Neutral	Red	Total
	Blue	13	19	1	33
1972	Neutral	24	459	5	488
	Red	0	9	3	12
	Total	37	487	9	533

Table II-13 displays the comparison of the predicted transitions for arithmetic signals to the observed signals. In this case, there is somewhat more variation than in reading. Both blue-to-blue and red-to-red show smaller populations than predicted. The difference in the blue distribution would be statistically significant ($\chi^2 = 3.25$ with 1 degree of freedom) at the 0.1 level, but not at the 0.05 level of significance. That is, there are fewer blues remaining blue than would have been predicted from 1971-72 data.

TABLE II-13

COMPARISON OF PREDICTED/OBSERVED
TRANSITIONS OF ARITHMETIC SIGNALS
BETWEEN 1972 AND 1973

	SIGNAL:	Blue	Neutral	Red
	Blue	13/8	19/25	1/0
1972	Neutral	24/27	459/454	5/7
	Red	0/0	9/11	3/1

There are also fewer reds remaining red than might have been predicted, although not statistically significant (the tables contain rounded data and the actual expected values are red-to-neutral = 9.4 and red-to-red = 2.6, where a binomial approximation of $\sigma = \sqrt{npq} = \sqrt{12(.22)\ (.78)} \sim 1.4$). Since the reduction is also somewhat symmetrical, one might also wish to examine the residual error at each point, if any significant behavior conditioned on signals had been found that might affect problem-solving signals in this way. Since no signal-conditioned actions were found that were likely to have caused this change, the behavior may be a function of the particular signaling technique in use on these data, or a function of test differences,[14] or a reflection of the myriad of changes taking place in a fairly unsystematic way within the school system.

6. CONCLUSION

These above illustrations display some of the properties and behavior of the operational signaling system in producing signals of cases of extreme relative performance. The signal curves illustrate but do not directly address some additional important policy questions raised by the distributions of achievement scores within the Atlanta School System. For example, the shape of the fitted curve shows that poorer schools tend to have increasingly lower achievement scores. That this is generally true in school systems has been documented by extensive national research. Whether lower scores in poorer schools are acceptable and whether methods are available to alter this condition in a local school system are policy questions of some magnitude. Signals provide no answer to these policy questions. Rather, the signaling technique merely points out that this condition seems to recur year after year.

What the signaling technique does adjust for is the economic level of the students at each school and, in essence, it creates a new "norm" (the fitted curve) for all schools based upon the economic level of the students at each school. Once this is done, it is seen that some grades at some schools still exhibit high or low performance relative to other schools with similar student populations. Signaling isolates these cases of high and low relative performance so that they are brought to the attention of the school system. That is, signaling provides short-term information: the locations in the school system where some extremes of relative performance are occurring after an adjustment has been made for the socio-economic characteristics of the student population.

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[14] There is some indication that the mathematical problem solving results may be distributed somewhat differently on the Metropolitan Achievement Tests than on the Iowa tests. The Department of Health, Education and Welfare had not released the results of its "anchor test" study of test comparisons in time for their use in this report. Later work may be able to consider this.

The next question for consideration is how the relationships between signals and the decisions and actions of school officials were established. The next chapter explains the approach used in this study.

CHAPTER III

THE EXPERIMENT: SETTING AND PROCEDURES

The signals, described in the preceding chapter, were distributed to Atlanta school officials in November 1972. The purpose of this chapter is to acquaint the reader with the Atlanta School System, to give the reader a perspective on the major events of the 1972-73 school year, and to describe the procedures used to monitor the activities of school officials in order to detect the impact of signal information.

A. CHARACTERISTICS AND STRUCTURE OF THE ATLANTA SYSTEM

When the schools opened in the fall of 1972, the Atlanta system had an enrollment of over 96,000 students, a teaching staff of 4,700 and an annual General Fund budget (excluding capital funds and most federal funds) in excess of $97 millions. Enrollment, which peaked several years ago, had declined to 91,000 by the end of the school year. Black students accounted for over 75 percent of the total enrollment in 1972-73, and the proportion continues to grow.[15]

Atlanta students typically attend elementary school (Kindergarten through Grade 7) and high school (Grades 8-12). However, there has been movement

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15. In September 1973, enrollment had declined to 89,000 students (approximately 80 percent black); the teaching staff had declined to 4,600 positions.

toward a new organizational pattern which will divide students into elementary (K-5), middle (Grades 6-8) and high schools (Grades 9-12). During 1972-73, there were 123 elementary schools, 5 middle schools and 25 high schools organized into five geographic areas. As total enrollment decreases, the total number of schools and the size of the teaching staff also decrease.

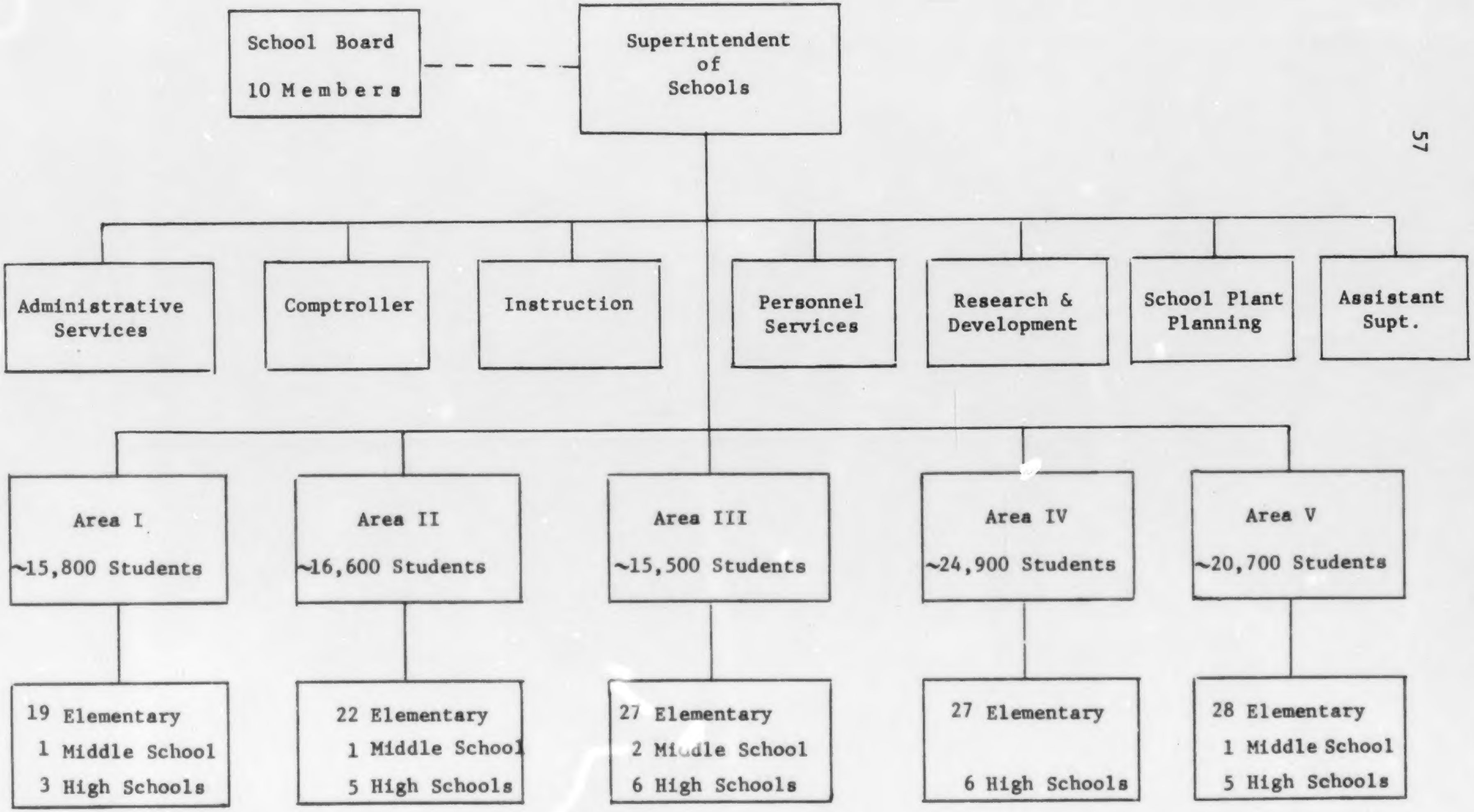
Figure III-1 illustrates the organizational structure of the Atlanta system during the year under study. Once every four years, voters in Atlanta elect a Board of Education to set general policy for the school system, in close consultation with the Superintendent and his staff. The School Board has authority to raise revenues for the operation of the schools; no public approval is required for changes in the property tax rate.

The School Board appoints the Superintendent and the other principal administrative officers of the system. The Superintendent of Schools presides over the day-to-day operations of the schools, aided by a staff of six Assistant Superintendents, a Comptroller and five Area Superintendents. Unlike many school systems, Atlanta has had no Deputy Superintendent. Flexibility has been the key organizing principle of the school system. The major officials of the school system have operated in the absence of any written definitions of their responsibilities and functions.

In general, the Assistant Superintendents and the Comptroller function as staff to the Superintendent. With one exception, each has been responsible for certain central activities associated with the operation of the schools. Each Assistant Superintendent provides services to schools and teachers which are usually filtered through the Area Office. Each Area Superintendent serves as a line administrator, responsible for all aspects of the educational process occurring in the schools in his geographic area.

FIGURE III-1: ORGANIZATION CHART

ATLANTA PUBLIC SCHOOL SYSTEM, 1972-73


School Board
10 Members
Superintendent of Schools
Administrative Services
Comptroller
Instruction
Personnel Services
Research & Development
School Plant Planning
Assistant Supt.
Area I
~15,800 Students
Area II
~16,600 Students
Area III
~15,500 Students
Area IV
~24,900 Students
Area V
~20,700 Students
19 Elementary
1 Middle School
3 High Schools
22 Elementary
1 Middle School
5 High Schools
27 Elementary
2 Middle School
6 High Schools
27 Elementary
6 High Schools
28 Elementary
1 Middle School
5 High Schools

What follows is a capsule description of the responsibilities of each major administrator and/or division within the Atlanta system as they existed in 1972-73.

1. Assistant Superintendent for Administrative Services. This division provides centralized services to the schools and to other parts of the central administrative structure. Major responsibilities include: purchasing and distribution of expendable supplies, materials, furniture, textbooks and library materials; maintenance of school buildings and grounds; operation of food programs; provision of school detectives to investigate crimes which occur on school property; maintenance of pupil records on attendance, enrollment, and mobility.

2. Comptroller. The Comptroller is responsible for the formulation of Atlanta's annual General Fund budget as well as for the supervision of all payroll and accounting activities which accompany the adoption of the budget. Atlanta has adopted a program budget format for the preparation and accounting of its funds. The computer facility is part of the Comptroller's responsibilities. Pupil attendance, property inventories, payroll, textbook, library and audio-visual supply purchasing, some grade reporting, high school student scheduling and achievement test processing are all computerized in Atlanta.

3. Assistant Superintendent for Instruction. The Instructional Division is the largest of the staff groups in the Atlanta structure. Although the division has about two dozen different components, its activities can be grouped into four broad categories: the development, maintenance and revision of curriculum; teacher training and staff development; the administration of special projects or programs (usually federally funded); and pupil services, including the administration of activities for exceptional children, guidance, health, and social services.

4. Assistant Superintendent for Personnel. This division is responsible for the recruitment, certification and placement of all school system personnel. Personnel directs the competitive process established for selecting individuals to fill any position above the level of the classroom teacher. Substitute teachers are recruited and certified by Personnel (although the individual school principal is responsible for arranging to have a particular substitute cover an empty classroom).

5. Assistant Superintendent for Research & Development. A primary function of the Research & Development unit is the development of new federal projects for the school system. Staff members prepare proposals and, once federal funding is secured, have responsibility for federally required evaluation of those projects. R&D coordinates all research projects underway in the school system. Staff members produce a newsletter, distributed throughout the school system, summarizing the results of selected educational research.

6. Assistant Superintendent for School Plant Planning. This division is responsible for the acquisition of land for future facilities, the planning and construction of all new facilities and major additions to existing facilities, major renovations, and for the equipping and furnishing of new buildings. Money for these activities comes from a separate Capital Funds budget. Most construction is done under contract to the school system.

7. Area Superintendents. The five Area Superintendents serve as the direct link between the Superintendent, the rest of his staff and the schools. Each Area Superintendent has a staff of instructional personnel, called Resource Teachers, who observe, assist and help train classroom teachers in the schools in that Area. The Area Superintendent figures prominently in every decision which affects the operation of a school: organization and staffing; recruitment and assignment of principals and teachers; selection of schools as sites for special programs; equipping or remodeling schools; assignment of pupils; curriculum selection; budget preparations; community relations, etc.

B. THE YEAR IN ATLANTA

The introduction of information about relative performance was not the only event to disturb the normal routine of the school system during the 1972-73 school year. In fact, 1972-73 witnessed major changes both in the organization of the school system and in the personnel responsible for its day-to-day operation.

Throughout the entire school year, the Atlanta School System was involved in a school desegregation suit whose settlement affected the assignment of students and staff and resulted in a major upheaval in the administrative structure and personnel of the school system. Between October 7, 1972, when the Appellate Court first ordered the school system to come up with an acceptable desegregation plan, and August 23, 1973, when that same Court finally upheld the plan (agreed upon by the plaintiff and the Atlanta School System in February 1973), for a period of nearly one year, the Atlanta school community was in a state of uncertainty about the scope and nature of any future arrangements.

Under the terms of the compromise plan finally accepted by the Court, no Atlanta school would have less than 20 percent black enrollment, although some all-black schools would remain. The required racial composition of Atlanta schools was to be achieved through a combination of techniques, including pairing of schools, voluntary student transfers, school closings and some busing. In 27 schools, teachers would be reassigned to alter the racial composition of the faculty. Over 2/3 of Atlanta's schools had been affected by the compromise plan by the time school opened in September 1973.

The compromise plan did not stop with the transfer of students and staff. A major feature of the compromise plan was the provision that at least 50 percent of the top administrative positions, including that of Superintendent, were to be filled by blacks. To accomplish this, 16 new administrative posts were to be created. The search for a new Superintendent began in the middle of the school year and continued until July 1973, when Dr. Alonzo A. Crim was named to succeed Dr. John W. Letson. The 16 new positions remained vacant and their responsibilities undefined, pending the arrival of the new Superintendent. The process of selecting a new Superintendent, coupled with the potential expansion and reorganization of the top-level administrative staff, created an atmosphere of uncertainty among existing administrative personnel which resulted in a general reluctance to make decisions or to take actions. To a large extent, the school system marked time during much of the year.

Quite independent of the desegregation plan, a number of other changes in key administrative personnel occurred during the year. For several years preceding 1972-73, none of the top 13 executive positions in the school system changed hands. Yet, within a 12-month period, beginning in August 1972, five of the executive staff, including the Superintendent, three Area Superintendents and the Assistant Superintendent for Personnel, were replaced.

Even the School Board was not immune from change during 1972-73. In March 1973, the portions of the Atlanta city charter governing the method of election to the School Board were revised. Effective as of the October 1973 election, the Atlanta School System will be governed by a nine, rather than a ten member School Board. The method of election of Board members was changed so that several of the then sitting Board members would have to step down or seek re-election from the same district.

As mentioned earlier in this chapter, total student enrollment has declined in recent years. Moreover, there have been important shifts among the existing population. As a result, the distribution of schools and students among the five geographic Areas had become very unequal. In October 1972, the School Board adopted a plan to divide the system into six Areas, each serving approximately 15,500 students and 25 schools. Because of the uncertainty over the desegregation plan, that reorganization plan was abandoned. Once the school closings and shifts of pupils necessitated by the desegregation plan were agreed upon, a new plan for organizing the school system was drawn up. The new plan, put into effect at the close of the 1972-73 school year, equalizes the number of schools and students in each of five Areas.

The administrative reorganization and the desegregation plan have had far-reaching effects on students and staff. Within the space of one school year, the following changes occurred: 12 schools were closed and 4 were opened; 2 high schools were converted to middle schools; 24 schools were affected by Area boundary changes. Alternative arrangements had to be made for students and teachers whose schools were closed. For those schools affected by the new Area boundaries, the new school year would mean a new Area Superintendent, a new set of Resource Teachers and, in general, becoming accustomed to a different style of administration. For Area Office staff, the changes have meant becoming familiar with the program, staff and problems of new schools.

The disruption resulting from the Court decision and the reorganization was compounded still more by a significant reduction in federal funds available to Atlanta under Title IV-A of the Social Security Act. In December 1972, Atlanta's share of Title IV-A funds for the next 12 months was reduced by about 80 percent (an amount equivalent to about 10 percent of the General Fund budget). The funds had been used to provide early childhood education programs, after-school programs for older children and a variety of supplementary services. The school system had hired staff under one-year contracts at the opening of school, on the assumption that Title IV-A funds would continue to be available at the 1972 level. The drastic reduction in IV-A funds for 1973 forced school system officials to close down programs in mid-year and to find other employment for IV-A staff with teaching contracts.

In sum, during 1972-73 a number of major changes occurred in the Atlanta School System to disrupt the normal activities of school personnel; these changes did affect the continuity of school system activities. However, no school system is ever static.

C. THE SCOPE AND STRUCTURE OF THIS STUDY

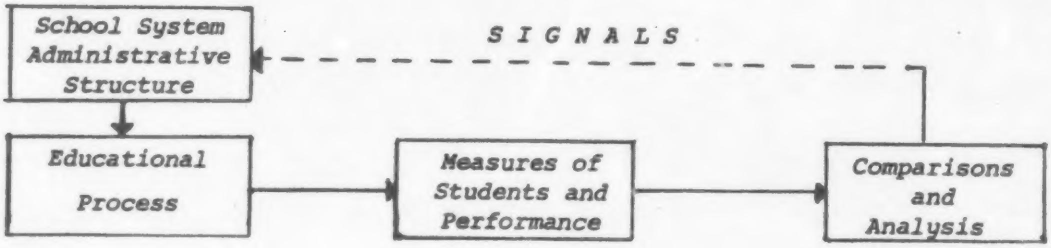
The research effort which is the subject of this report began in November 1972 with the distribution of signal information to Atlanta school officials. The objective of the study was to determine what effect (if any) the previously unavailable information on relative performance had on the management of the school system. The hypothesis which was the subject of investigation can be stated as follows:

> Information on relative performance, when introduced into a sufficiently well-understood planning and management structure, does (or does not) produce measurable changes (a) in the decision-making process of a local school system, (b) in the decisions made by school officials, and (c) ultimately, in school performance.

In its simplest form, the question of whether the signals had an effect on school system management involves an analysis of the information feedback loop within the school system. Figure III-2 represents that simple feedback loop.

FIGURE III-2

SIMPLE FEEDBACK LOOP


School System Administrative Structure
SIGNALS
Educational Process
Measures of Students and Performance
Comparisons and Analysis

The school system has an administrative structure which is responsible for the operations of the educational process. That process occurs in a set of schools and classrooms which comprise the school system. Signals are derived from measures which define the composition of the schools and the performance of the students in those schools. Comparisons are made from these measurements and the results analyzed and synthesized to produce a set of signals which are then fed back into the schools' administrative structure. In theory, if school system officials respond to the signals and alter their actions, the resulting changes should affect subsequent measurements, comparisons and signals. The cycle is then repeated.

In an actual school system, of course, the process is not that simple. The administrative structure of a large school system involves several layers, each with different responsibilities and differing degrees of influence over the educational process. Each administrative unit may have need of different information to support the decisions it can make. The process of education occurs in hundreds of classrooms throughout the system. Each school has a different set (or sets) of students and an educational program that may vary substantially from grade to grade. A basic purpose of the school system is to make changes, over both the long and the short term, in the knowledge and behavior of its students. Measurements of educational process, the students, and their performance are, at best, imperfect and often non-existent. And, instead of one feedback loop, there will be many--to each administrative level in the school system, to the school board, to the general public, to parents. Each party to a decision brings pressure to bear on the educational process in response to a variety of incentives. The question under study has been the extent to which signals of relative performance became an incentive to school system officials to change the educational process.

Any assessment of the impact of information on the operations of a large, complex organization is both difficult and time-consuming. It was necessary to limit this one-year research effort to manageable proportions by focusing on those portions of the school system originally thought to have some immediate, direct impact on the grade or classroom where the measure of relative performance is taken. Based on earlier work in Atlanta,[16] it had become apparent that the introduction of signal information would not have an equal impact on the operations of all parts of the school system. While it could be argued that all school system officials should have an interest in information about relative school performance, not all units within the administrative structure had an equal opportunity to affect the process of education in the classroom in the short time space of this study.

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[16] White, _et al_., _op. cit_.

Two criteria were used to select the administrative units to be studied in the effort to discover the effects of signal information on the school system's operations: (1) there must be some direct interaction between the administrative unit and the classroom; and (2) the administrative unit must have some flexibility to react to signal information. The first criterion reflects the fact that the signals are derived from the school and its component grades or classrooms. Each signal reflects the relative level of performance of the students in a particular grade at a particular point in time, rather than the level of performance of a group of students in an entire school or in a special program (e.g., Title I) or special project (e.g., after-school study centers). Some administrative units clearly have more direct links to the classroom than others. The second criterion, the flexibility to act, also stems from the nature of the signals. Signals represent clues to the existence of problems and successes at a particular point in time. Less than one school year elapsed between the distribution of 1972 signals and the production of 1973 signals. Some administrative decisions or practices could not be expected to change in so short a period of time.

Applying these two criteria to the Atlanta administrative structure, four units of the school system seemed most likely to be affected by information about relative school performance: the Area Superintendents and their staffs, the Divisions of Instruction and Personnel, and the principal. Each of these administrative units has direct and sometimes daily contact with the educational process at the classroom or grade level. These units work singly and often in concert to improve that process. Yet, there was little evidence that the performance of students had been a major consideration in decisions governing most of the activities of any of the administrative units under study.

The principal, the Area Superintendents and their staffs, and the Divisions of Instruction and Personnel engage in a variety of activities which may affect the educational process. In its simplest form, the components of that process can be thought of as students in a classroom, an instructional program and a teacher or teachers. This study considers those activities which can affect the process from the outside: (1) changing the teacher or teachers; (2) changing the content or the materials used in instruction; (3) augmenting the skills of the teacher(s). Educational practitioners (and the authors of this report) make the assumption that changes in staff, the instructional program or the skills of the staff can improve the performance of students in the classroom. And, since the level of relative performance of a grade in a school is the basis for the signals, the activities of principals, Area Superintendents and their staffs, and the Instruction and Personnel Division which may change the staff or the skills of staff or the instructional program in a grade have been the subject of this inquiry. In each case, the study team attempted to determine how the activities are "normally" carried on by school officials and how signal information affected those activities. The following paragraphs pose some of the questions about the impact of signals.

1. Effects on the Recruitment, Assignment and Reassignment of Staff. Decisions about school staffing involve principals, Area Superintendents, and the Personnel Division. Prior to the introduction of signals, decisions about the recruiting and placement of new teachers did not appear to be influenced by data on student performance in the grade where a vacancy existed. Neither did student performance appear to enter into decisions about the reassignment of existing staff or the composition of the staff at a school or in a grade. Would signal information affect decisions about the desired skills or characteristics of new teachers, the placement of new teachers, the reassignment of existing staff, the staffing of an entire school?

2. Effects on the Instructional Program. After consultation with teachers, principals, Area Office staff and members of the Instruction Division, changes may be made in the structure, content or materials of the instructional program in a grade. Are signals used by any of these parties in decisions about where to make changes in the instructional program or in deciding which changes to make? Do staff of the Instruction Division or the Area Office attempt to associate extremes of relative student performance with particular textbooks, instructional approaches or organizational arrangements?

3. Effects on Efforts to Improve the Skills of Teachers. Improvement in the skills of teachers can be made in several ways: through the provision of direct assistance to the teacher by another member of the school system's staff or through the teacher's participation in in-service training programs. Area Resource Teachers, who are curriculum specialists assigned to Area Offices, regularly provide direct assistance to classroom teachers and also conduct workshops and supervise other in-service activities. The Instruction Division also organizes in-service programs. Do signals influence the way in which Resource Teachers allocate the time or effort they spend in direct assistance to teachers or the decision about which teachers to assist? Are signals a factor in decisions by principals or Resource Teachers to refer teachers to in-service training courses? Are signals used in decisions about the subjects of in-service programs?

Once the administrative units of primary interest to this study were identified, efforts were made to determine the extent to which the new information (signals of relative performance) was utilized in the completion of assigned responsibilities. In the short run, there could be at least two different kinds of impact or effect. The new information could have had a direct effect on the actions of one or another part of the school system.

For example, as a result of the signals, a principal might have done something to treat the situation revealed by the signals. But the new information might have had little or no direct effect on action and still had an effect on the deliberations which precede the decision to act. In this latter case, the observed pattern of action will have remained unchanged, but the signals might have been consulted by the parties to the action. In the longer run, the cumulative effect of using new information in thinking about a course of action should be to affect the action taken. Since this study focused on a time span of less than one year, it has been concerned with the effects of signal information both on actions taken by school officials and on their deliberations, whether or not any action was taken.

As stated earlier, this project is predicated on the twin assumptions that the activities and actors selected for study have some potential for affecting the educational performance of students and that those activities might be affected by signal information. The truth of the first assumption remains to be demonstrated because the interactions described in this study are not well documented either in the research literature or, more importantly, in the Atlanta School System. In other words, there is neither an accepted, recognized level of interaction between any two parts of the school system, nor a clear relationship between increases in the quality or quantity of the interaction and increases in student performance.

The absence of any advance knowledge about the level or content of "normal" activities selected for study has had important implications for testing the effects of signals. First, considerable effort was devoted to preparing a description of these routine activities, without regard to signal information. Second, it was clearly impossible to specify in advance what level of change would occur in any activity after the introduction of signals.

Therefore, the approach taken has been to see if grades which received signals indicating relatively high or relatively low performance were given disproportionate attention by school officials.

The next section of this chapter explains the procedures used to gather data during the study.

D. PROCEDURES USED IN THE STUDY

Two different techniques were used to gather new data for the study: structured interviews with participants in the activities under examination and special forms or surveys on which Atlanta personnel recorded information about specific activities. Efforts to learn about the school level of the Atlanta School System focused on a randomly selected sample of 37 elementary schools.

1. STRUCTURED INTERVIEWS

Table III-1 (see next page) provides an indication of the scope and content of the interviews conducted during the course of this study. Principals, Area Superintendents and Resource Teachers were interviewed on two different occasions.

In several instances, similar questions were asked of the parties to an activity or decision which might affect the classroom or grade to provide a picture of how each viewed the service rendered or the decision made. Information about the activities of Resource Teachers, Area Superintendents and the Division of Instruction collected during 1972-73 was augmented by less structured interviews in an earlier phase of this project.

TABLE III-1

STRUCTURED INTERVIEWS

DATE OF INTERVIEW	PERSONS INTERVIEWED	FOCUS OF INTERVIEW
December 72/ January 73	5 Area Superintendents	Reactions to signals; explanation of specific signals; anticipated response to signals.
August 73	4 Area Superintendents	Actions taken since introduction of signals.
February 73	31 Resource Teachers	Reactions to signals; explanation of specific signals; descriptions of the nature and extent of Resource Teacher contacts with teachers, principals, Area Superintendents, Instruction Division staff, and other parts of the school system.
June 73	18 Resource Teachers	Whether and how Resource Teachers had responded to signal information; review of Resource Teacher assistance to classroom teachers.
January - February 73	37 Principals	Reactions to signals; information about the general organization of the school, its staff, socio-economic composition; contacts between the school and other parts of the school system.
May 73	37 Principals	Specific actions taken as a result of signals; services provided to the school by Resource Teachers, Instruction Division staff; changes in instructional program and staff for the coming school year.
January - August 73	3 Personnel Staff	Information about the process of staffing schools and the effects of signals on that process.
May 73	6 Instruction Division Staff	Information about services provided to schools and the procedures for making changes in curriculum or textbooks.

2. REPORTED DATA

Three new data collection instruments were devised and used in this study. Each is described below.

a. REPORT OF SCHOOL VISIT FORM

The Report of School Visit form (Figure III-3) was designed for use by a Resource Teacher each time he/she visited a school to assist a teacher. The form provided the first uniform information about which schools and which teachers received assistance from Resource Teachers, as well as other important information about the nature of the assistance provided. The Resource Teacher indicated on the form the status of the teacher visited (tenured or probationary), school and grade visited, the primary subject in which assistance was given, length of the visit, who initiated the visit, the services rendered during the visit and the diagnosis or recommendation made. The forms were printed in triplicate, so that two copies could be retained in the Area Office for use there.

The forms were used regularly by Resource Teachers in all five Areas from October 1972 until the end of the school year. There were 83 Resource Teachers assigned to Area Offices in 1972-73, including both curriculum specialists (60) and social workers, psychologists and visiting teachers (23). The forms were intended for use primarily by curriculum specialists. Table III-2 provides information about the use of the Report of School Visit form in each Area. Since no comparable data about this facet of Resource Teacher activity existed prior to this time, it is difficult to determine the extent to which the data provided by Resource Teachers accurately portrays their activity. However, the variation in the total number of forms completed by individual Resource Teachers, both within and among the Areas, may indicate that Resource Teacher visits to schools were under-reported.

FIGURE III-3

ATLANTA PUBLIC SCHOOLS

Report of School Visit

(DO NOT WRITE IN DARK BOXES)

Resource Teacher's Name: ____________ 1☐☐☐☐

Name(s) of Teacher(s) Visited		Grade/Title		Check one		Check one	
				Tenured	Probationary	Initial visit	Revisit
____________	5☐☐☐☐☐		10☐☐	☐	☐	☐	☐
____________	16☐☐☐☐☐		21☐☐	☐	☐	☐	☐
____________	27☐☐☐☐☐		32☐☐	☐	☐	☐	☐

School ____________ 38☐☐☐☐☐

Date of visit ____________ 43☐☐☐☐

Primary subject in which assistance was given (Check one) 47☐☐

__ reading 01
__ math 02
__ language arts 03
__ science 04
__ social studies 05
__ art/music 06
__ foreign language 07
__ physical education 08
__ vocational education 09
__ discipline 10
__ organization 11
__ planning 12

Place an **X** on the line below to indicate the approximate length in hours of this visit (excluding travel time).

½ 1 1½ 2 2½ 3 3½ 4 4½ 5 5½ 6 49☐☐☐

1. Who initiated this visit? (Check all that apply) 52☐☐☐☐☐
   __ a. You
   __ b. Classroom teacher
   __ c. Principal
   __ d. Area Superintendent
   __ e. Other (specify: ____________)

2. What services did you render during this visit? (Check all that apply) 57☐☐☐☐☐☐
   __ a. Observation of the teacher
   __ b. Demonstration of teaching technique, materials or equipment
   __ c. Consultation or conference
   __ d. Assistance with or interpretation of tests
   __ e. Assistance with extracurricular project
   __ f. Other (specify: ____________)

3. What recommendation did you make? (Check all that apply) 63☐☐☐☐☐☐
   __ a. Recommend workshop or in-service program ____________
   __ b. Recommend proficiency modules ____________
   __ c. Follow-up visit scheduled for ____________
   __ d. No follow-up necessary
   __ e. Problem referred to another Resource Teacher ____________
   __ f. Other (specify: ____________)

4. Additional comments on the visit.

TABLE III-2

RESOURCE TEACHER RESPONSE TO REPORT OF SCHOOL VISIT FORM BY AREA, 1972-73

	AREA I	AREA II	AREA III	AREA IV	AREA V	TOTAL
Number of Resource Teachers in Area	20	20	11	16	16	83
Number of Resource* Teachers Returning Form	13	8	9	12	10	52
Number of Forms Returned*	672	221	1012	1010	266	3181
Fewest Forms Completed* by Any Resource Teacher	6	5	16	2	2	-
Most Forms Completed by Any Resource Teacher*	177	76	294	335	74	-

* Numbers exclude visits reported to secondary schools since the analyses of how signal information affected Resource teacher visits are confined to those grades for which signals existed (i.e., Grades 1-7).

b. REPORT OF WORKSHOP OR IN-SERVICE PROGRAM FORM

The Report of Workshop on In-Service Program form was also designed for use by Resource Teachers. It provides information--again, for the first time--about the effort Resource Teachers devote to in-service training activities during the year. The Report of Workshop or In-Service Program form (Figure III-4) was completed by Resource Teachers each time that they prepared and/or conducted a workshop or in-service program. The Resource Teacher recorded information about who prepared the program, how much time was spent in preparation, who conducted it, the subject and objectives of the program, its length of time and who attended it. Table III-3 provides information about the number of workshop forms completed during the 1972-73 school year.

FIGURE III-4

ATLANTA PUBLIC SCHOOLS

Report of Workshop or In-service Program

Do not write in this space

Area ________ Date of this program ________________________________

Program prepared by: ________________________

Program conducted by: ________________________

Continued from: ______________________ (Date)

Will be continued on: ______________________ (Date)

Time of this program: from __________ to __________

Subject ____

Objectives ____

Total time spent in preparation for this program __________ hours

Names of participants at the program

NAME	SCHOOL	GRADE/TITLE

TABLE III-3

RESOURCE TEACHER RESPONSE TO REPORT OF WORKSHOP OR IN-SERVICE PROGRAM FORM, BY AREA, 1972-73

	AREA I	AREA II	AREA III	AREA IV	AREA V	TOTAL
No. of forms completed	70	0	87	33	14	204
No. of Resource Teachers completing forms	12	0	7	10	7	36

c. CLASSROOM TEACHER SURVEY

A mail survey was sent to a sample of teachers in 37 elementary schools selected for intensive study. The survey was designed to gather information about the kinds of services which were actually received by classroom teachers in 1972-73. Such information would provide a picture of how the teacher perceived the services provided by other parts of the system and would help to corroborate information gathered in other parts of the study.

The 37 elementary schools were composed of 199 grade levels or cells. Teachers in 96 of those cells were included in the survey: 48 cells were selected at random and 48 cells were selected to provide additional information about the services provided to teachers of grades where performance was relatively high or low. A total of 233 teachers received questionnaires in May 1973; each questionnaire was accompanied by a letter explaining its purpose and assuring the respondent's anonymity.

Table III-4 shows for each Area the number of teachers sampled and the number and proportion of questionnaires returned.

TABLE III-4

RESPONSE TO TEACHER QUESTIONNAIRE, BY AREA

AREA	Number Sampled	Number Returned	Percentage Returned
I	45	31	69
II	46	34	74
III	53	26	49
IV	52	35	67
V	37	28	76
TOTAL	233	154	66

The next two chapters of this report describe what was learned as a result of these data collection activities.

CHAPTER IV

THE MANAGEMENT OF LARGE URBAN SCHOOL SYSTEMS-- AS OBSERVED IN ATLANTA

One of the results of this study has been the accumulation of knowledge about the actual operations of a large, urban school system. This chapter presents the information in terms of a discussion of each of the three decision areas chosen for study: staffing, the instructional program and improving the skills of staff.

A. INTRODUCTION

This study is concerned with the effects of information on the management of a large school system. It is based on the assumption that actions of school officials which directly affect the educational process will ultimately affect the performance of students in the classroom.

The preceding chapter identified the parts of the school system administrative structure and the three activities which have been chosen for study. The tasks addressed by this chapter are (a) to define for those activities how decisions are made and how the various administrative parts fit together and (b) to identify the existing bases for making decisions and the incentives which exist for or against change. An understanding of these tasks will, in part, account for the way Atlanta officials responded, or failed to respond, to signal information.

Most of the material in this chapter was collected during the 1972-73 school year. Each set of activities which will be discussed in the remainder of this chapter is assumed to have a direct effect on the level of performance in the classroom or grade--and, thus, an effect on the signals of relative performance.

B. THE RECRUITMENT, ASSIGNMENT AND REASSIGNMENT OF STAFF

There are two basic sources of teachers for any classroom: the teaching staff already employed by the school system and the pool of applicants for teaching positions. Decisions about which teacher or teachers stand before a class may involve the principal, the Area Superintendent and the Personnel Division. Personnel Division staff take the lead in recruiting new teachers and in making the initial assignment of each new teacher; the Area Superintendent plays the central role in the transfer or reassignment of existing teachers. The interactions which occur between the Personnel Division, the Area Superintendent and the principal when a new teacher is hired or a teaching assignment is changed are described below.

1. RECRUITMENT OF NEW TEACHERS

The process of recruiting potential teachers for Atlanta schools operates somewhat independently of the actual need for teachers in the classroom. Personnel Division staff direct the recruiting drive, supported by a recruitment committee composed of representatives from all parts of the school system. Most recruiting has centered on college campuses; as a result, most new teachers hired by Atlanta have been recent college graduates.

The annual cycle of hiring and assigning new teachers occurs as follows:

- Throughout the school year: a file of candidates is created by accepting and screening applications from prospective teachers. Applicants complete a standard written application form, which is supplemented by a personal interview.
- Late spring and summer: "blanket contracts"[17] are offered to candidates based on decisions about the number and type of new teachers required for the subsequent school year.
- Late summer and early fall: vacancies which cannot be filled with existing teachers are filled by new teachers; additional teachers are hired and assigned as needed.

Ordinarily, vacancies which have not been filled by the reassignment of existing staff are filled by new teachers. The request for a new teacher originates with the principal, who identifies the grade and school where the vacancy has occurred and the race needed to maintain the required racial composition of the faculty. The principal sends the request to the Area Superintendent, who reviews it. If approved, the request is forwarded to Personnel. In addition to information about the location, grade and the race of the position, Personnel may have available information on the instructional approach or organizational pattern used in the school. While official information available to aid placement is limited, principals and Area Superintendents do communicate to Personnel information about the vacancy on an informal basis.

Once the assignment is made, Personnel informs the teacher, principal and Area Superintendent. If the teacher accepts the assignment, the Personnel Division considers the vacancy "filled" and does not participate further in the transaction. In only a very few cases is the new teacher hired with knowledge of the grade and school to which he or she will be assigned. The principal may receive formal notification that a new teacher has been assigned to the school after the teacher has arrived. Principals have no advance information about the characteristics of the new teacher or the teacher's instructional strengths and weaknesses.

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[17] A "blanket contract" is a contract to teach in the Atlanta School System with the specific assignment to be made later.

All new teachers are required to participate in an orientation program. Half of the program is designed and conducted by the Area Office staff and half by the central teacher training staff of the Instruction Division.

A new teacher is on probation for a period of three years. At the end of each of those years, the principal must appraise the teacher's performance and make a recommendation about whether the teacher is to be retained for another year. The Area Superintendent reviews the principal's rating and recommendation. Before supporting a recommendation not to retain a probationary teacher, the Area Superintendent usually makes an independent appraisal of the teacher, either directly or by sending a Resource Teacher to observe the teacher's performance.

Since total student enrollment has been declining for the past several years, the need for new teachers has resulted primarily from resignations and retirements of existing staff. Resignations are submitted by the teacher directly to the Superintendent, with copies to the principal and Area Superintendent. For the 1970-71 school year, an extensive recruiting effort was required to fill the large number of vacancies which occurred following the court-ordered adjustment of the distribution of black and white teachers at each school in the Atlanta system. By September of 1970, approximately 1,000 new teachers were offered jobs for the school year--nearly double the usual number. In September 1972, the school system hired and placed 324 elementary school teachers. Due to the rapidly declining enrollment and the closing of 12 schools, no new elementary school teachers were hired prior to the opening of school in September 1973.

2. ASSIGNMENT OF EXISTING STAFF

During the course of employment by the Atlanta School System, a teacher may be transferred to a new grade assignment, transferred to a new school (in the same Area or in another Area) or may be promoted to another position within the school system.

a. TRANSFERS WITHIN A SCHOOL

In Atlanta, as in nearly all school systems, the most common and basic pool of personnel consists of the staff at an individual school. Once assigned to a school, a teacher is under the immediate supervision of the principal. Typically, the final assignment of teachers to specific grades, classes and tasks is made by the principal. In particular, principals can and do alter grade assignments of teachers in the school from school year to school year or, in some cases, during the school year. These transfers can be motivated by any of the following: teacher dissatisfaction with an assignment; suggestions by the Area Superintendent; decisions to alter the staffing pattern and instructional program in the school. The Area Superintendent is always consulted about a change, but Personnel is not involved in these decisions. The Personnel Division is notified of a change in grade assignments, but there may be a considerable time lag.

b. TRANSFERS AMONG SCHOOLS

Each spring, the principal and Area Superintendent meet to review the school's instructional program, staffing needs and budget for the coming year. Based on the student enrollment projected for the following September, the staffing allocation for the school is established. The combined staffing allocation for all schools in an Area form a somewhat self-contained personnel pool. As long as an Area Superintendent maintains acceptable student/teacher and black/white staff ratios at each school, he can redistribute personnel assigned to schools in the Area at his discretion; he need not seek the approval of Personnel or of other Area Superintendents.

Staff may be transferred into a school for any or all of the following reasons: increasing enrollment at the school; resignations or retirements of existing staff; changes in the organization or instructional program at the school; special needs of the students; to meet the required racial composition of the faculty. At their annual spring staffing conferences, the principal and Area Superintendent review the type of personnel needed at the school. The Area Superintendent looks first to the pool of teachers within his Area in making assignments to a school. It is only when the Area Superintendent cannot fill the positions by transferring staff within his Area that the other Area Superintendents and the Personnel Division are called into the staffing process.

Principals have relatively little input into the decision about which teacher(s) will be transferred into their schools. If a principal knows a specific teacher is available and that the teacher has the necessary attributes for the job, the Area Superintendent may help in getting that teacher assigned to the school. In most cases, a teacher is transferred into the school without the advice or consent of the principal. The principals interviewed expressed dissatisfaction with the way in which these transfers take place. At present, the formal notice of the arrival of a new teacher comes from Personnel; the notice gives only the name and previous school assignment of the teacher. Principals expressed their preference for more information about the new teacher in advance of the teacher's arrival at the school.

Requests for transfer may be sent directly to the Area Superintendent by the teacher; such requests do not need the approval of the principal. A request for transfer is sent on to Personnel by the Area Superintendent. The teacher may indicate his/her preferences for reassignment. Administrative transfers (those due to school closings or the elimination of positions at a school) have priority over requests for reassignment due to personal reasons. The Personnel Division takes an active role in the reassignment of teachers only when the transfer involves more than one Area. Then Personnel compiles a list, ordered in terms of seniority, of all teachers requesting a transfer and distributes the list to all Area Superintendents. A teacher who is transferred can appeal the transfer directly to Personnel.

3. SUMMARY

During the past 12 months, four factors have governed the staffing decisions of Atlanta officials. Decreasing student enrollment has had an obvious impact on staffing. No new teachers, except special education teachers, have been hired since January 1973; Atlanta now has a huge waiting list of applicants for teaching positions. The closing of 12 elementary schools and the conversion of two high schools into middle schools is the second factor affecting decisions about staff assignments. Teachers from closed schools are given priority in new assignments; high school teachers are not always qualified to teach in middle school grades. The third major factor affecting staffing has been the drastic cutback in federal funds (especially Title IV-A). Teachers hired under annual contracts had to be absorbed by the system when federal funds were cut in mid-year. Atlanta has not had to let any teachers go thus far. The natural attrition of staff due to retirements and resignations has made the situation somewhat less desperate. The major factor governing staffing assignments for 1973-74 is the need to meet the requirements of the court-ordered racial ratios in individual schools.

C. SHAPING THE INSTRUCTIONAL PROGRAM

Decisions affecting the instructional program (the second component of the educational process at the classroom level) are also made at several levels within the Atlanta system. The details of the instruction program for a particular grade or school are the primary concern of the principal and staff at the school. The development and revision of curriculum for the entire system are a major concern of the Division of Instruction. The implementation and day-to-day review of certain facets of the instructional program in the classroom fall to the staff of the Area Office. Each unit works with the others, even on those activities for which one unit assumes primary responsibility. The next two sections describe the shaping of the instructional program from the perspective of a school and of the school system as a whole.

1. SHAPING THE INSTRUCTIONAL PROGRAM FOR A PARTICULAR GRADE OR SCHOOL

Atlanta principals claim major responsibility for decisions about the way grades or classrooms are organized and the instructional materials and approach used throughout the school. The principal will discuss and seek approval for changes in organization or instructional approach with the Area Superintendent. Most principals tend to share responsibility for decisions about organizational or curriculum changes with the teaching faculty. The choice of textbooks is often made by vote of the entire faculty or the faculty of the grade(s) involved. Over the past few years, there has been a shift from the traditional self-contained classrooms toward more flexible teaching arrangements. Once a different organizational pattern is adopted, Area Resource Teachers are usually called upon to provide assistance to the school (principal and teachers) in implementing the new pattern.

The principal and teachers can and do seek advice on instructional matters from both the Instruction Division staff and Area Resource Teachers. The Instruction Division sometimes sends information to the school concerning new text offerings in various subject areas; curriculum guides are created to assist teachers; information is available about texts and materials; periodic workshops are sponsored by the Instruction Division for principals and teachers. Principals have indicated that advice on the choice of textbooks is the most sought after service provided by the Instruction Division. While curriculum coordinators from the Instruction Division do visit schools, principals interviewed in this study claim overwhelmingly to initiate those visits. The two exceptions to this statement are those schools where there are federal projects (e.g., Follow-Through or Title I) operating and those schools piloting the new elementary curriculum. Direct involvement in the instructional program at a school by Instruction Division staff is more frequent in these instances.

A complaint frequently expressed by principals is that there is no routine way in Atlanta to share information about good practices which exist in a school or schools. The principals feel that the existing mechanisms for exchanging information about a particular method or text or innovation at a school or by a particular teacher are inadequate. The Division of

Research and Development does summarize and disseminate information about research findings, but the presentation may be too general or the results not timely enough for the needs of the principal. While the Area Superintendents have regular meetings of all principals, even these meetings do not provide an appropriate forum to exchange ideas for several reasons. First, the meetings include principals of all schools--primary, elementary, middle, and high schools--and the innovation may be at such a fine level of detail that only a few of those present would be interested. Perhaps more importantly, the agenda for these meetings is often fixed, with no place on it for a general discussion of innovative ideas or practices. Within the school, the principal may encourage teachers to observe the classes of colleagues who have demonstrated instructional success. But principals repeatedly expressed the need for a regular, systematic way to share the information beyond the school level.

2. SHAPING THE INSTRUCTIONAL PROGRAM FOR THE SCHOOL SYSTEM

Within the broad outlines of an instructional program for the entire system, each school attempts to tailor its specific educational program to the needs of its students. The Division of Instruction, which takes the lead in molding that program, is the largest of the staff groups in the Atlanta structure. The development of curriculum and the administration of special projects (usually federally funded) are two of its major activities,[18] which bear directly on the educational process in the classroom.

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[18] The other broad categories are teacher training (discussed in the next section of this chapter) and pupil services. These categories are arbitrary groupings used by the authors of this report. The Instruction Division has about two dozen components, each headed by a director or coordinator. It has had no formal organizational structure.

In the Atlanta system, the development or revision of curriculum is a joint undertaking, rather than the exclusive responsibility of the Curriculum Development department. The entire elementary curriculum is undergoing revision by a committee composed of teachers, principals, Area Superintendents and Area Resource Teachers, as well as staff from the Instruction Division. According to a 1970 progress report, the Elementary Curriculum Revision Committee was given the task of developing a curriculum model which "would enable a teacher to begin teaching any child at his performance level in a given area and help him move forward." The model was to include:

- provisions for individualizing instruction (analysis and diagnosis, appropriate content, teaching strategies, and evaluation)
- provision for the child to perform adequately on his own level (self-pacing, self-evaluation, and self-direction)
- plans for continuous progress of students
- provision for the development of self-understanding and understanding of others.[19]

The revised curriculum was introduced on a pilot basis at one school in 1971-72. During the period covered in this study, the revised curriculum was in use at nine more schools. Each school which adopted the new curriculum was provided with a manual containing information on how to implement the curriculum, teaching aids (such as the teaching model), as well as technical assistance from the Curriculum Revision Committee's staff. In addition to technical assistance provided directly from the Instruction Division, one Resource Teacher in each Area was responsible for assisting the elementary schools piloting the new curriculum and for obtaining equipment and/or materials needed to implement it. In the administration of the school with the new curriculum, there is a heavy dependence on community involvement and joint decision making among principal, teachers and parents. The ten pilot schools were selected because it was believed that the principals, staffs and parents would be receptive to the new curriculum and methods of organization.

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[19] "Elementary Curriculum Revision Committee Progress Report," Atlanta Public Schools, Summer 1970, p. 1.

Another major project of the Instruction Division is the Comprehensive Instructional Program (CIP), a locally funded compensatory education project designed to improve the basic skills of elementary students. The CIP program was begun three years ago. During its first two years, it concentrated on the teaching of reading in the primary grades; last year the focus was expanded to include the teaching of arithmetic in upper elementary grades. The two tangible products of the CIP program to date have been the development of diagnostic reading tests for use in identifying and correcting reading problems of individual students and the development of proficiency modules for use by elementary school teachers of reading and math.[20] No special diagnostic test for arithmetic has been developed.

The mechanism for implementing the CIP program has been the assignment of 19 Resource Teachers to the five Area Offices to assist principals and teachers in improving the teaching of reading and arithmetic. However, once Resource Teachers were assigned to the Area Offices, it was left to the Area Superintendent to decide how the Resource Teachers would be distributed among the schools in the Area. The director of the CIP program and the Resource Teachers meet weekly to discuss issues of common concern.

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20. Proficiency modules will be discussed in more detail in the teacher training section of this chapter.

Staff of the Instruction Division, known as subject-area coordinators or specialists, are available to individual schools or teachers for consultation on curricular matters. However, most of the curriculum coordinators are oriented toward middle and high schools. One way the Instruction Division does have a direct effect on elementary schools is in the selection and purchase of textbooks. Most textbooks are paid for with state monies and their adoption is subject to state approval. According to state guidelines, a textbook may have a life of no more than five years. Once every five years, the state reviews all texts in a given subject or discipline and produces a list of textbook series that can be used in the state of Georgia. Following the publication of one of these lists, the Atlanta Textbook Coordinator establishes a committee of teachers, Resource Teachers, and Instruction Division staff to review and rate texts on the basis of their appropriateness for use with students performing at various levels. The results of these reviews (about a paragraph on each text series) are distributed to the principal as a basis for selecting text series for use in the school. Typically, one text series in a given discipline is adopted for an entire school.

3. SUMMARY

Decisions about the shape and content of the instructional program are probably the best example of the fluid management which characterizes the operation of Atlanta schools. Each instructional decision usually involves one or more representatives of each administrative level in the Atlanta system. Educational goals are vaguely worded. The outlines of the instructional programs to meet those goals are filled in under the direction of the Instruction Division staff. This staff, however, spends relatively little time actually in the classroom. Instead, the Instruction Division looks to Area Resource Teachers to make operational those guidelines. There appears to be a lack of any clear delineation of the responsibilities of Area Superintendents and their staffs on the one hand and the Instruction Division on the other, for the implementation of the instructional program. As a result, the principal and teachers at a school make the crucial decisions about the actual way in which the curriculum is assembled and implemented. No well-defined feedback mechanism exists for staff outside the school to determine what kind of instructional program really exists in a classroom and what problems the teacher may encounter in implementing the curriculum.

D. IMPROVING THE SKILLS OF THE TEACHING STAFF

A third set of actions which affect the educational process in the classroom are those which attempt to improve the skills of the teaching staff. Two kinds of actions will be considered: (1) the provision of direct assistance to classroom teachers, which usually occurs on a one-to-one basis; and (2) the participation by the teacher in one of the structured teacher training activities available in Atlanta.

1. DIRECT ASSISTANCE TO TEACHERS

Classroom teachers can and do initiate requests for direct assistance. Often they turn to colleagues on the staff or to the principal. However, because the principal and the teacher have daily contact within the school, the principal is often the person who first becomes aware that a classroom teacher needs assistance. According to principals interviewed in this study, a major clue to a teacher's performance comes from the principal's personal observation of the teacher. Most principals report several visits a week to each classroom to check on both teacher and student progress. Casual visits to the classroom are augmented by periodic conferences between the principal and teacher. The principal may also demonstrate a lesson for a teacher or teachers; 40 percent of the principals interviewed reported giving demonstration lessons on such topics as reading, how to use diagnostic tests, science and story telling.

Outside the school, the most readily available source of assistance for the classroom teacher is the Area Resource Teacher. Sixty of the 83 Area Resource Teachers are curriculum specialists; the number of curriculum specialists assigned to any one Area varies from 6 to 15. Math, science, English, foreign language and social studies Resource Teachers are assigned to work primarily with high school teachers and principals. Art, music and library Resource Teachers work with art or music teachers or librarians assigned to the schools in the Area, and only infrequently with classroom teachers directly. The remainder of the curricula specialists in each Area work almost exclusively with elementary schools.

The way in which the Resource Teachers are utilized varies from Area to Area. Some Area Superintendents assign each elementary Resource Teacher to a group of schools (although the number of schools assigned varies from Resource Teacher to Resource Teacher, even within the same Area). Decisions about which teachers to assist, what services to provide or the conditions under which a visit is made are usually left to the discretion of the Resource Teacher.

During 1972-73, Resource Teachers reported 3181 visits[21] to elementary or middle schools. Each time a visit was made, the Resource Teacher was asked to indicate who initiated the visit: the Resource Teacher, the teacher, the principal, the Area Superintendent. Table IV-1 below presents the responses to that question [multiple responses were permitted], tabulated by Area.

TABLE IV-1

INITIATORS OF RESOURCE TEACHER VISITS, 1972-73*

Initiator	Total (n=3181)	Area I (n=672)	Area II (n=221)	Area III (n=1012)	Area IV (n=1010)	Area V (n=266)
Resource Teacher	64%	63%	69%	49%	77%	68%
Teacher	23%	30%	23%	20%	20%	27%
Principal	19%	23%	11%	22%	16%	19%
Area Superintendent	12%	27%	2%	9%	11%	0.4%

*Source: Report of School Visit Forms

According to the information provided by Resource Teachers, half to three-quarters of all visits to elementary or middle schools are initiated at least in part by Resource Teachers. Teachers are credited with initiating visits more often than principals.

Resource Teachers may provide assistance to teachers in a variety of curricular or instructional areas. During 1972-73, Resource Teachers were asked to indicate, for each visit reported, the primary subject of the assistance given. Twelve options were provided: nine related to curricular areas; the other three were planning, organization and discipline. Although asked to indicate only one subject for each visit, most Resource Teachers

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21. See Chapter III p. 70 ff. for an explanation of the use of the Report of School Visit Form.

reported providing assistance on several topics during a single visit. Table IV-2 below summarizes data on the subject of the assistance reported during 1972-73.

TABLE IV-2

SUBJECT OF THE ASSISTANCE GIVEN BY RESOURCE TEACHERS, 1972-73*

SUBJECT OF ASSISTANCE	Total (n=3181)	Area I (n=672)	Area II (n=221)	Area III (n=1012)	Area IV (n=1010)	Area V (n=266)
Reading/ Language Arts	47%	64%	29%	24%	55%	82%
Arithmetic	10%	13%	1%	4%	14%	16%
Social Studies	5%	2%	13%	8%	3%	3%
Science	4%	6%	2%	2%	5%	2%
Planning/ Organization	36%	44%	16%	42%	27%	43%
Discipline	3%	6%	3%	2%	3%	4%

*Source: Report of School Visit Forms

Reading and language arts have been the most frequent subject of Resource Teacher visits, except in Area III. The frequency with which assistance was provided in other subject areas drops off sharply. Planning and organization seem to have been the other major concerns during 1972-73.

An examination of data on the number of schools and grades visited at least once during the year provides another insight into the pattern of assistance provided to classroom teachers. Based on reports filed by Resource Teachers, at least one classroom teacher (K-7) was visited in all but four of the 127 elementary and middle schools during 1972-73; in addition, Resource Teachers reported visits to principals and other staff not assigned directly to the classroom (e.g., music teachers) in more than 85 percent of the schools.

The number of grades visited at least once during 1972-73 is shown in Table IV-3 below. The data are presented by Area, first for Grades 1-7 and then for kindergarten. Based on reports filed by Resource Teachers, teachers in 60 percent of the 946 grades in Atlanta elementary and middle schools were visited at least once during the year. There was considerable variation among the Areas in the coverage reported by Resource Teachers.

TABLE IV-3

PROPORTION OF GRADES
VISITED BY RESOURCE TEACHERS, 1972-73*

Area	Grades 1-7		Kindergarten		Grades K-7	
	Total	% Visited	Total	% Visited	Total	% Visited
I	126	75%	19	89%	145	77%
II	154	41%	22	77%	176	45%
III	179	62%	27	44%	206	60%
IV	189	71%	27	33%	216	67%
V	175	58%	28	11%	203	51%
Total	823	61%	123	47%	946	60%

*Source: Report of School Visit Forms

Perhaps a better indication of the extent of the direct assistance provided by Resource Teachers can be seen in Table IV-4 below. The table shows the frequency with which Resource Teachers visited individual grades (1-7) in individual schools. While frequency does not say anything about the length of the visits or the nature of the assistance provided, it does indicate the amount of exposure Atlanta teachers had to Resource Teacher assistance in the classroom. Thirty percent of 506 grades (1-7) visited were visited only once during the year; 15 percent were visited only twice by Resource Teachers; just 8 percent of the grades visited were visited more than ten times. The pattern of visits by Area IV Resource Teachers

TABLE IV-4

FREQUENCY OF VISITS TO GRADES 1-7 BY RESOURCE TEACHERS, 1972-73*

Percent of Grades 1-7 Visited

Frequency of Visits	Total (n=506)	Area I (n=95)	Area II (n=63)	Area III (n=112)	Area IV (n=135)	Area V (n=101)
1	29%	29%	48%	31%	14%	36%
2	15	8	21	16	11	20
3	12	10	11	12	14	13
4	10	13	2	10	10	12
5	6	7	10	4	7	4
6	6	4	6	5	6	8
7	4	2	3	5	7	4
8	3	6	0	4	4	2
9	3	7	0	0	6	1
10	2	2	0	4	4	0
Over 10	8	9	0	8	17	1

*Source: Report of School Visit Forms

is somewhat different. In that Area, 17 percent of the grades visited were visited on more than ten occasions, and only 14 percent of the grades visited were visited only once.

The pattern of assistance to classroom teachers varies from Resource Teacher to Resource Teacher. Table IV-5 (see next page) presents information about the visits reported by each of the 52 Resource Teschers who supplied information for 1972-73. The designations I-A, I-B, etc., identify individual Resource Teachers who filed reports. Column 1 indicates the total number of elementary and middle schools visited by that person, either to aid a classroom teacher or to visit with some other member of the school's staff. Column 2 indicates the number of those schools for which at least one report of assistance to a teacher in Grades 1-7 was made. Column 3 shows the number of different teachers (in Grades 1-7) assisted by each Resource Teacher during the year.

TABLE IV-5

SCHOOLS VISITED AND CLASSROOM TEACHERS ASSISTED, BY RESOURCE TEACHER, 1972-73*

RESOURCE TEACHER BY AREA	COLUMN 1 TOTAL NUMBER OF SCHOOLS VISITED	COLUMN 2 SCHOOLS WHERE ASSISTANCE WAS PROVIDED TO TEACHERS IN GRADES 1-7	COLUMN 3 TOTAL NUMBER OF TEACHERS ASSISTED IN GRADES 1-7
I-A	18	6	7
I-B	15	12	19
I-C	8	0	0
I-D	4	0	0
I-E	5	5	39
I-F	2	2	31
I-G	11	9	26
I-H	12	3	5
I-I	6	4	5
I-J	7	5	34
I-K	5	0	0
I-L	10	0	0
I-M	3	3	17
II-A	4	4	4
II-B	11	2	4
II-C	8	7	17
II-D	5	4	12
II-E	19	19	47
II-F	5	4	18
II-G	19	3	3
II-H	4	0	0
III-A	27	25	72
III-B	28	15	44
III-C	22	10	46
III-D	22	11	20
III-E	26	19	48
III-F	13	4	6
III-G	29	0	0
III-H	24	13	21
III-I	11	1	1
IV-A	14	13	28
IV-B	8	1	1
IV-C	19	16	35
IV-D	10	10	79
IV-E	5	5	45
IV-F	8	7	82
IV-G	2	2	4
IV-H	5	5	24
IV-I	1	0	0
IV-J	3	3	8
IV-K	12	0	0
IV-L	2	0	0
V-A	5	3	7
V-B	4	4	14
V-C	9	2	2
V-D	4	4	11
V-E	2	2	2
V-F	4	4	44
V-G	13	9	35
V-H	4	4	26
V-I	4	4	39
V-J	2	0	0

* Source: Report of School Visit Forms Completed During 1972-73

As can be seen in Table IV-5, the number of schools visited by a single Resource Teacher ranged from 29 to 1; the number of teachers in Grades 1-7 assisted by a single Resource Teacher ranged from 82 to 0. Two-thirds of the 52 Resource Teachers reporting visited at least one school in which no classroom teacher was assisted. Variations within Areas are as great as variation between Areas.

The reports filed by Resource Teachers accounted for 3,625 hours[22] spent visiting the schools. Table IV-6 shows the total amount of time each Resource Teacher reported (Col. 1) and the amount of time spent with classroom teachers in Grades 1-7 (Col. 2). The final column in Table IV-6 shows the proportion of reported time spent with teachers in Grades 1-7. The remaining portion of each Resource Teacher's reported time was spent with principals, kindergarten teachers and other staff not directly assigned to a grade. Although 52 Resource Teachers reported visits to schools, ten of them worked exclusively with school staff not assigned directly to Grades 1-7.

In summary, according to the reports filed by Resource Teachers, the direct assistance provided by them during 1972-73 tended to be primarily self-initiated. Reading/language arts and planning/organization were the primary subjects of assistance rendered. Resource Teachers visited teachers in 61 percent of the elementary grades at least once during the year. Fifty-six percent of the grades which were visited at all by Resource Teachers were visited three times or less during the year. The number of schools visited, the number of teachers assisted, the amount of time spent in direct assistance varies from Resource Teacher to Resource Teacher.

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[22] This total probably underrepresents the time spent at schools for three reasons: the forms were not used during the first month of school; Resource Teachers do not appear to have reported every visit to a school; no time was reported on approximately 3 percent of the completed forms.

TABLE IV-6

TIME SPENT AT SCHOOLS VISITED, BY RESOURCE TEACHER, 1972-73*

RESOURCE TEACHER BY AREA	COLUMN 1 TOTAL TIME (IN HOURS) REPORTED SPENT AT SCHOOLS	COLUMN 2 TOTAL TIME (IN HOURS) REPORTED SPENT IN GRADES 1-7	COLUMN 3 PERCENT OF TOTAL REPORTED TIME SPENT IN GRADES 1-7
I-A	148	28	19
I-B	42	25	60
I-C	73	0	0
I-D	70	0	0
I-E	184	136	74
I-F	22	22	100
I-G	89	54	61
I-H	66	6	10
I-I	9	6	66
I-J	128	90	70
I-K	8	0	0
I-L	40	0	0
I-M	24	24	100
II-A	4	4	100
II-B	44	8	18
II-C	56	49	87
II-D	24	20	85
II-E	64	60	93
II-F	32	26	82
II-G	40	3	8
II-H	15	0	0
III-A	124	75	60
III-B	302	39	13
III-C	150	83	55
III-D	77	40	52
III-E	160	69	43
III-F	46	7	15
III-G	55	0	0
III-H	86	52	60
III-I	25	2	8
IV-A	60	58	97
IV-B	14	0.5	4
IV-C	101	83	82
IV-D	313	267	85
IV-E	107	98	91
IV-F	376	339	90
IV-G	7	7	100
IV-H	36	36	100
IV-I	6	0	0
IV-J	36	32	90
IV-K	46	0	0
IV-L	2	0	0
V-A	7	6	86
V-B	22	22	100
V-C	32	8	25
V-D	15	13	87
V-E	2	2	100
V-F	70	67	96
V-G	110	66	60
V-H	39	38	97
V-I	76	62	82
V-J	2	0	0

*Source: Report of School Visit Forms Completed During 1972-73.

2. TEACHER TRAINING ACTIVITIES

Another approach to improving the skills of the classroom teacher, teacher training, may be defined as the set of organized and structured courses, workshops and other enrichment activities available to Atlanta teachers. Participation in one or another of the teacher training activities almost always occurs as a result of a decision by the teacher. A teacher may enroll in teacher training activities for a variety of reasons: to earn a salary increment; to improve general skills; to learn new techniques; to obtain an advanced degree; to enhance the possibility of promotion within the school system's hierarchy. While a principal, a Resource Teacher or other personnel may suggest that a teacher enroll in a training program, no one may compel a teacher to attend.

There are four major types of teacher training opportunities offered to Atlanta teachers: university courses outside the Atlanta school system; programs sponsored by the Instruction Division; workshops conducted by Area Resource Teachers; and proficiency modules. Each of these teacher training activities will be described below.

a. UNIVERSITY COURSES OUTSIDE THE ATLANTA SCHOOL SYSTEM

A teacher may enroll in a university course for credit towards a salary increment or to obtain an advanced degree. The Atlanta Area Teacher Education Service (AATES), founded in 1945, publishes each year a list of courses offered at local universities which have been approved for salary increment credit by the school system.

Very little is known about which specific teachers are enrolled in such courses. Several principals interviewed indicated that teachers at their schools were enrolled in these courses. When a teacher successfully completes a course, the school system is notified. The Personnel Division maintains the payroll records for the school system and is notified by the Instruction Division when a teacher has completed sufficient training to be entitled to a salary increase.

b. INSTRUCTION DIVISION PROGRAMS

The Instruction Division sponsors a variety of courses, conferences and workshops for Atlanta staff, including teachers. This Division is also responsible for the orientation program which each new teacher in Atlanta is required to complete.

Training activities sponsored by the Instruction Division usually have salary increment credit associated with them and are known in Atlanta simply as "in-service" activities. At the beginning of each school year, a list of the courses or workshops to be offered during the year is distributed to Atlanta staff. The list of workshops or in-service programs is amended throughout the year, as new courses are offered.

Final data were not available on participation in 1972-73 programs sponsored by the Instruction Division. There was no indication, however, that the pattern of participation would differ substantially from that for the preceding school year. According to the school system's data, 57 approved courses were offered by the Instruction Division in 1971-72. The courses varied in subject matter, length and the kind of participants who enrolled. Subjects relevant to elementary teachers included are: art (2 courses), communications skills (1 course), English (2 courses), mathematics (2 courses), science (3 courses) and social studies (7 courses).

A total of 1,507 staff members participated in those courses. Atlanta records do not indicate how many different teachers were involved in these in-service programs. The school system does not maintain permanent or historical records either on which staff members have received in-service training in a given subject or what the training may have involved. At no time are principals officially or systematically informed which teachers are enrolled in an in-service program. The teacher usually informs the principal directly, but no mechanism exists to give the principal or Area Superintendent a record of which teachers are enrolled.

The Instruction Division is also responsible for organizing an orientation program for each new Atlanta teacher. The Instruction Division establishes guidelines for the program which require the new teacher to attend special meetings, to observe an experienced teacher and to visit local points of interest. Each Area Office tailors the contents of one-half the orientation program to meet the needs of the Area.

c. AREA WORKSHOPS

Resource Teachers conduct workshops for teachers and other staff of the schools in each Area. During 1972-73, Resource Teachers in four of the five Areas provided information about the workshops conducted through the Area Office. Information on 204 in-service programs was provided by 36 different Resource Teachers on the Report of Workshop or In-Service Program form.[23] No forms were received from Area II Resource Teachers.

Workshops were offered on a variety of topics: reading, art, team teaching, classroom management and testing, to name but a few of the subjects. Reading (or language arts) was named in more than 25 percent of the forms as the topic of the workshop. No other topic was so often the subject of an Area workshop. Only 6 percent of the workshops dealt with arithmetic, although 15 percent of the teachers surveyed in conjunction with this project indicated a desire for in-service programs in arithmetic. Approximately 10 percent of the workshops dealt with classroom organization or management or the planning of the instructional program.

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[23] See Chapter III, p. 72 for a description of the form.

A typical Area workshop is organized and conducted by Area Office staff for the benefit of all teachers in the Area. However, more than one-third of the workshops were held at individual schools and were attended exclusively by the teachers at the school where the workshop was held. In one Area, 11 workshops were organized for the faculty at a newly opened school.

More than half the workshops were attended by more than ten persons; attendance ranged from a high of 100 to a low of four persons. The typical program was conducted after school hours and lasted about two hours. Nearly three-fifths of the workshops were completed in a single session; the remainder were continued over several sessions. Some Area workshops spanned several calendar months and met on a weekly basis.

d. PROFICIENCY MODULES

Proficiency modules represent a new direction in in-service training: a series of structured individualized instruction for teachers. The modules were developed several years ago by the school system and the University of Georgia, as a part of the Comprehensive Instructional Program (CIP). To date, modules have been completed in reading and arithmetic. A module is designed so that a teacher takes a test to determine proficiency in teaching math or reading. The results of the test determine weaknesses of the teacher, who then may choose one of several learning paths to gain needed proficiency.

Each teacher progresses through the module at his/her own rate, completing one topic at a time. The School Board in late December 1972 adopted a policy that probationary teachers who do not satisfactorily demonstrate proficiency in teaching must complete at least one module before being advanced to tenured status. Implementation of this policy is only just beginning.

Successful completion of a set of proficiency modules carries with it salary increment credit, and the overall supervision of modules rests with the Instruction Division. Day-to-day management of the modules falls to the Area Office; Resource Teachers assist classroom teachers with the modules by providing needed materials and by being available at specified times for assistance. The classroom teacher must pass a written test on the contents of each module unit and then successfully demonstrate the newly acquired proficiency in a classroom situation.

Each Area Office was asked to provide a list of participants in the modules and to indicate which teachers completed the module program. Area III does not use the modules, but the other four Areas provided some information about participation. In Areas II and IV, a total of 42 teachers enrolled in the module program; these Area Offices did not indicate how many teachers completed the modules. In Areas I and V, a total of 66 teachers enrolled in the modules, but only 15 completed the module program.

E. CONCLUSION

This chapter has focused on three areas of the Atlanta school system that affect the educational process as it occurs in the classroom. Changes in staffing assignments, in the instructional programs, and in the skills of classroom teachers have been discussed in terms of the decisions that are made, the actions that result and the actors who influence them.

The process described is not a systematic one; decisions are made in response to a variety of pressures. Actions are often taken on a case-by-case or _ad hoc_ basis. Information about the performance of students rarely enters the decision process.

The next chapter describes the effects observed when information on school performance was introduced during the 1972-73 school year. Particular emphasis is placed on effects of signals on the three activities described in this chapter.

CHAPTER V

EFFECTS OF THE INTRODUCTION OF SIGNALS

This chapter presents the reactions of Atlanta personnel to the idea of comparing relative performance and then discusses the impact of signal information on the three types of activities discussed in the previous chapter: staffing, the instructional program and improving the skills of the staff.

A. INTRODUCTION

At the outset of the current study, two different kinds of signal materials were distributed to Atlanta staff: (1) booklets[24] containing a brief explanation of the derivation of signals, the signals and mean achievement scores for each school in an Area; (2) sheets displaying the signals for all schools in an Area for each of two years (1971 and 1972). A smaller booklet was prepared for each school principal containing the explanation of the derivation of signals and the signals and mean achievement scores for his/her school.

The distribution of these materials began in November 1972. Signal booklets were never distributed directly to teachers, since the signals were viewed primarily as a management tool for use by school officials above the school level. The extent to which signals were made available to teachers was left to the discretion of the principal. [Principals of six schools requested and received additional booklets for distribution to teachers.]

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[24] Figures II-3 and II-4, p. 31 provide an illustration of the signals for a school.

Signal materials were distributed to principals and Area Resource Teachers through a series of briefings organized by each Area Superintendent. Signal materials were explained and distributed to Instruction Division and Personnel Division staff in December 1972 and January 1973.

The effects of the introduction of signals in Atlanta will be discussed in the next two sections of this chapter. The idea of signaling relative performance was generally favorably received. Since the impact of signal information is partly a function of how the information is received, the next section of this chapter describes the reactions of school system officials to the idea of signaling relative performance. The final section examines the impact of signals on the activities described in the preceding chapter.

B. REACTIONS TO SIGNALS AMONG SCHOOL OFFICIALS

The reaction to signals of relative performance throughout all layers of the Atlanta administrative structure was generally positive. There was widespread praise for the format used to present a massive amount of data in a clear, concise manner. Two Area Superintendents noted that previously they had never had time to examine student performance as measured by achievement test results because of the volume of data involved. The computer print-out of achievement test results for the schools in a single Area is usually several inches thick. Principals also commended the format and the handy size of the signal booklets.

Reactions to the idea of comparing relative performance of schools were somewhat more varied. Atlanta staff at all levels endorsed, in principle, the comparisons of schools which have similar student populations. Especially appealing to some principals was the idea of comparing performance among Atlanta schools, rather than with the national norm established by the achievement test manufacturers.

The same ambivalence toward the use of achievement test results to judge performance which has been expressed by the larger community of educators was echoed by Atlanta officials. While admitting their use of achievement results to confirm opinions about teachers, curriculum or students, school officials (especially principals) expressed concern over the reliability and appropriateness of achievement tests as an evaluative tool.

The signaling technique relies on participation in the free and reduced-price lunch program[25] as the criterion for identifying similar schools. Criticism of the use of subsidized lunch participation in generating signals came almost exclusively from a few principals and Resource Teachers. They expressed reservations about the use of free and reduced-price lunch data to describe the socioeconomic composition of a school. Because the income cut-off point for eligibility to participate in the program is so low, principals of some schools where small numbers of students receive subsidized lunches felt that the variable overstated the economic composition of the school. That is, two schools--one composed of the children of corporation presidents and the other, children of assembly line workers--may both have comparable rates of participation in the subsidized lunch program, but would not be expected to have similar patterns of achievement.

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[25] See Chapter II, p. 25 for the discussion of how the variable is used in conjunction with mean achievement to generate signals of relative performance.

Some recipients of signals suggested that, because of the controversy over school desegregation and the unusual degree of student mobility due to as yet uncertain busing patterns, the variable was not suitable at the present time; these officials usually conceded that subsidized lunch participation would be a satisfactory socioeconomic indicator when the situation becomes more stable. Suggestions for other variables to use in lieu of or in addition to free and reduced-price lunch participation included neighborhood stability, teacher and/or pupil attendance data, community involvement, parental interest in the school, and evaluations of teacher performance. No one interviewed could offer a satisfactory source of data presently available in Atlanta for measuring these attributes.

In the initial round of interviews,[26] Area Superintendents, Resource Teachers and principals were asked to account for the existence of particular red or blue signals.[27] In the second round of interviews, these officials were questioned about how signals had been used or who in the school system could have most use for the information.

Few principals expressed surprise at the signals for their schools; this reaction lends operational support to the statistical evidence of the validity of the signals. The presence of a blue signal in a grade was generally attributed by the principals to the success of a teacher or teachers. The presence of a red signal was generally attributed to student discipline problems, student transiency, overcrowding, the absence and/or inexperience of particular teachers. Principals had more difficulty accounting for situations in which the signals for the same grade in math or reading were different. Many principals wanted to know why certain grades were signaled and not others; they felt that explaining the reasons for signals would lead to the development of solutions to problem situations.

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[26] See Chapter III, p.68, for a description of these interviews.

[27] The reader is reminded that a red signal (either full or half red) indicates relatively low student performance and a blue signal (either full or half blue) indicates relatively high performance. Most grades receive a neutral signal indicating no extreme of performance. (See Chapter II.)

Principals were very inconsistent in their responses to questions about the usefulness of signal information. Nearly 30 percent of the principals interviewed felt that signals could be of most use to principals and teachers, while less than half felt that Area personnel could make best use of signal information. When questioned about the routine interactions between principal and teacher, few principals felt signals would have any effect on those interactions. The principals did suggest that signals could affect the relationship between the school and the Area Office. They predicted that the signals might cause both the Area Superintendent and Resource Teachers to pay more attention to grades with red or blue signals, that Resource Teachers might visit those grades more often, that Area staff might set up workshops to deal with problems suggested by patterns in the signals. Principals were less certain about the effects of signal information on the activities of the Instruction Division or the Personnel Division.

Resource Teachers and Area Superintendents had more difficulty in interpreting signals for specific schools and grades because the impressions on which they base their judgments of performance are not equally current for all schools. The presence of a red or blue signal tended to be explained in terms of the "quality of teaching" in that grade or the overall "quality" of the faculty at the school. Other explanations for signals--either red or blue--included curriculum changes, test administration, teacher attitudes, and the presence of "unusual" students at the school.

Both Area Superintendents and Resource Teachers tended to focus on red signals. Several Resource Teachers planned to examine the reading programs in grades with red signals in reading or in schools with several red signals. One Area Superintendent was so surprised by the red signals at two schools in the Area that he changed the assignment of one of the reading Resource Teachers to include those schools.

In summary, the signals of relative performance distributed for the first time in Atlanta in late 1972 were well-received, particularly by principals, Area Superintendents and Resource Teachers. The underlying principle of comparing performance in similar schools was accepted. The method of displaying signal information won praise for its simplicity. The transition from accepting the idea in principle to the application of signal information to decisions by school officials was much more difficult to make. The remainder of this chapter discusses the effects (or lack of effects) of signals on (1) the assignment of teachers and the staffing of schools; (2) the shaping of the instructional program; and (3) improving the skills of the teaching staff.

C. IMPACT OF SIGNALS ON TEACHER ASSIGNMENT AND SCHOOL STAFFING

From the beginning of this study, Atlanta officials have said that the classroom teacher is a key factor in whether or not students progress. As reported above, Area Superintendents, Resource Teachers and principals alike attributed the presence of red and blue signals to the quality and attitudes of the teaching staff. Yet neither the assignment of individual teachers nor the staffing of schools has been substantially affected by the introduction of information about relative performance. Throughout the year, decisions about individual teacher assignments and the staffing of entire schools were influenced by considerations of the racial composition of faculties and the declining student enrollment.

Information on relative performance, as reflected in the signals, was expected to be useful in hiring new teachers and in reassigning existing staff. When signals were explained and distributed to them, Personnel Division staff expressed interest in using signals to identify characteristics of teachers in red and blue signaled grades. They hoped to determine if training, years of experience, type of certification or teacher turnover appear to affect the level of performance among grades in similar schools. Thus, signals could be used as an output measure in a research effort to determine characteristics of successful teachers. The results of such an effort could be used as a screening device in selecting new teachers or in making teacher assignments.

Although the Personnel Division staff showed an interest in using signals to improve procedures for screening applicants, there is no evidence that any one followed through on this interest. The small size of the staff of this Division in reality meant that no single staff member had the time needed to direct or conduct the research needed to answer questions about teacher characteristics. Moreover, the value of signal information to Personnel staff is reduced because information about which specific grades and schools will require new teachers is not available during the normal time of recruiting and hiring new teachers.

The potential impact of signal information on the reassignment of existing staff is higher. As long as signals can be available prior to the time most new assignments are made (over the summer and during the first weeks of the new school year), then signals can provide information about the current and proposed assignment for the teacher in question.

Signals played no part in the selection of new teachers, since no new elementary teachers have been hired by Atlanta since the introduction of signals. Moreover, according to the Assistant Superintendent for Personnel. signals played no part in central decisions about teacher reassignment made during the last months of the 1972-1973 school year. Area Superintendents provided only one instance of the use of signal information in reassigning staff. One Area Superintendent reassigned several teachers who had been in a school with several red signals to schools with several blue signals in the hope that the teachers would be influenced by the high performance of teachers in their new schools. The new assignments were to take effect in September 1973.

D. IMPACT OF SIGNALS ON THE INSTRUCTIONAL PROGRAM

The development of curriculum guidance for the entire school system and the demonstration of new instructional approaches within the school system are usually multi-year activities. Moreover, Title I and other federal programs have certain restrictions on where and how money can be used. Consequently, it might have been predicted that signal information would have little or no impact on decisions relating to the instructional program in the short period of this study. At best, it might have been predicted that signals would be used by Instruction Division staff to investigate the characteristics of the instructional program in grades where performance was either relatively high or relatively low. There is no evidence to show that signals were even considered in decisions involving the shape of the instructional program for the school system.

The elementary school curriculum is being revised. As the new curriculum guidelines are developed, they are being field-tested in a sample of schools. The number of schools piloting the new curriculum by September 1973 had doubled to 20. There has been no quantitative evaluation of the new curriculum to date, nor is one planned. Neither performance information in general, nor the signals in particular, seem to have affected the choice of pilot schools or the appraisal of the curriculum being developed.

The Comprehensive Instructional Program (CIP) is another example of an instructional activity which is aimed at improving student performance. When the program began in 1970, 50 of Atlanta's elementary schools were designated CIP intensive schools, on the basis of a combination of economic need (using 1965 data) and fourth grade reading performance. The evidence is that some of the 50 schools received more attention than the other 75 Atlanta elementary schools; some did not. In fact, as was reported in Chapter IV, it was left to the discretion of each Area Superintendent to decide how CIP Resource Teachers were to be used. The CIP conducted its own evaluation for the first two years of its existence, but this effort has been abandoned. Signals might be used as an indicator of where intensive assistance should be provided, and changes in signals could serve as an indicator of program effectiveness. While the Instruction Division staff of the CIP were familiar with signals, they gave no indication of having used signals in the operation of the program.

Signals did not stimulate investigations of the characteristics of the instructional programs in red or blue signaled grades. For example, Instruction Division staff could cite no attempts to develop empirical evidence of the success or failure of particular texts. Although several principals reported adopting new textbooks for the coming year signals played no part in the decision about which texts to adopt. Nor did Resource Teachers report using signals in decisions about particular texts or materials. While 30 percent of the first grades in one Area received red signals in math and 40 percent of the third grades in another Area received blue signals in math, neither Area Office personnel nor curriculum development staff reported having given any thought to what might have occurred in those grades. Neither Area Superintendents nor principals reported using signals in discussions about the instructional program for the schools. One principal in the survey did use the signals to support a decision to restructure the arithmetic program in a grade which had received red signals for two years in a row.

E. IMPACT OF SIGNALS ON EFFORTS TO IMPROVE THE SKILLS OF THE TEACHING STAFF

Two mechanisms for improving teacher skills--direct assistance to classroom teachers and structured teacher training activities--were described in the preceding chapter. The remainder of this chapter is concerned with whether signals had an impact on the provision of direct classroom assistance to teachers. The evidence of that is largely quantitative; in the case of in-service training, the evidence is mostly qualitative and based on personal interviews.

No Atlanta official reported using signal information in the provision of teacher training. The Resource Teachers who organized and conducted workshops could cite no instances of the use of signals in decisions about the subjects to be offered or the location of the workshops. Neither principals nor Resource Teachers remembered directing a teacher from a red signaled grade to enroll in an in-service program or proficiency module, although both principals and Resource Teachers did make such recommendation without regard to signals.

Answers to questions about the impact of signals on Resource Teacher assistance to classroom teachers are more complex. As described in Chapter III, Resource Teachers provided information on visits to schools during the 1972-1973 school year on the Report of School Visit form. The recorded information was processed to create a data base for analyses of Resource Teacher assistance during the 1972-1973 school year, to determine if signals had a measurable effect on the distribution of that activity among elementary grades. Information was not available on the pattern of Resource Teacher activity prior to September 1972, nor was there any agreement *a priori* as to what should be the pattern of direct assistance by Resource Teachers. Consequently, the analyses have been restricted to variations within the pattern of activity for the 1972-73 school year. In particular, the following question was addressed.

- Can variation in patterns of Resource Teacher activity during the 1972-1973 school year be associated or contrasted with variation in patterns of signals for 1972?

That is, it was assumed that the signals based on 1972 achievement, which were distributed in late 1972, could affect the pattern of Resource Teacher activity for the 1972-73 school year.

By using different measures of activity and different definitions of patterns of activity, a variety of "associations" or "contrasts" can be examined to provide evidence of the effect or lack of effect of signals. Three general measures have been used in the analysis to categorize Resource Teacher assistance to teachers: grades visited, time expended on visits, and the frequency of visits. As will be seen shortly, a variety of specific measures can be defined for each of the three. Two patterns of Resource Teacher activity have been considered—the distribution of Resource Teacher activity over all the grades that could have been visited and the distribution of Resource Teacher activity among the grades actually visited. The first distribution was used to answer the question:

- Among the grades that existed (and conceivably could have been visited) did Resource Teachers give a disproportionate amount of assistance to grades having a particular type of signal?

The second distribution was used to answer the question:

- Among the grades that were in fact reported as having been visited, did Resource Teachers give a disproportionate amount of assistance to grades having a particular type of signal?

Both questions were addressed in order to take into consideration restrictions on Resource Teacher activity which may have prevented them from providing assistance to some grades, independent of the type of signal that existed.

All of the analyses presented below are based on those visits by Resource Teachers which involved at least one classroom teacher in Grades 1-7 in primary or elementary schools.[28] The focus on Grades 1-7 was dictated by the fact that these are the only grades for which signals existed. Thus, instead of the 3,181 Resource Teacher visit forms which were collected and used to describe Resource Teacher activities in Chapter IV, the analyses of the effects of signals on Resource Teacher assistance to the classroom are based on the 1,875 visits involving classroom teachers. The remaining 1,306 visits were to principals and other school staff not directly assigned to the classroom.

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[28] The number of visits and grades used in this chapter are sometimes different than those used in Chapters II and IV because in those chapters different sets of schools were used as bases for analysis and discussion. Here visits to schools (or grades) for which there were no signals (blue, neutral or red) in 1972 were omitted.

The remainder of this section is divided into two parts. The first part examines the impact of signals on the distribution of Resource Teacher assistance among all grades in Atlanta; the second part examines the impact of signals on the actual assistance provided.

1. THE IMPACT OF SIGNAL INFORMATION ON THE ALLOCATION OF RESOURCE TEACHER ASSISTANCE

The results presented below compare the observed distribution of Resource Teacher assistance to classroom teachers with what would have been expected if assistance had been given in proportion to the total number of all grades with each type of signal. If the observed and expected distributions do not differ significantly, then it can be concluded that the Resource Teachers did not give a disproportionate amount of assistance to grades having a particular type of signal. Such a result could be interpreted as an indication that signal information did not affect the allocation of Resource Teacher assistance to classroom teachers.[29] This interpretation seems reasonable, since the aim of the signals is to identify extremes of performance on the assumption that the system will react to this information and provide evidence of disproportionate attention to the grades exhibiting extremes of performance.

Two terms are used throughout the analyses presented below: the expected distribution and the observed distribution of Resource Teacher assistance.

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[29] The distribution of Resource Teacher assistance in prior years may have been quite different from that observed in 1972-1973. Thus, it could be argued that the introduction of signals was associated with a redistribution of Resource Teacher effort. Baseline data on the distribution of assistance prior to the introduction of signals are not available, rendering impossible such pre/post comparisons.

Expected distribution: The distribution which would be expected if Resource Teacher assistance were provided in the same proportion as blue, neutral and red signals[30] for April 1972 were distributed among the grades that existed.

Observed distribution: The actual distribution of any measure of Resource Teacher assistance provided in 1972-73 to grades identified as having received a blue, neutral or red signal in April 1972.

Analyses have been conducted using the observed and expected distributions defined in terms of several measures of Resource Teacher assistance: grades visited, time expended and frequency of visits. For each measure, the observed distribution of Resource Teacher assistance has been calculated for all grades in Atlanta and for all grades in each Area. The analyses of the distribution of Resource Teacher assistance by Area seemed necessary since Resource Teachers are assigned to an Area Office and the pattern of their activity might be expected to vary among the Areas. All analyses were conducted using the observed and expected distributions defined relative to reading and arithmetic signals. The results were similar. Therefore, data presented below refer primarily to reading signals. In those few cases where different results occur for arithmetic, the exceptions are noted.

a. EFFECT OF SIGNAL INFORMATION ON GRADES VISITED BY RESOURCE TEACHERS

The most basic measure of Resource Teacher assistance is "which grades are visited," without regard to the amount of assistance given. Resource Teachers state that it is not possible to visit every grade.

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[30] Throughout these analyses, the term "blue signal" refers to relatively high performance as indicated by a full or half blue signal; "red signal" refers to relatively low performance as indicated by a full or half red signal; "neutral signal" refers to performance which is not signaled as extreme. (See discussion of signals in Chapter II.)

A total of 806 grades which existed in 1972-73 received a signal in April 1972: 10.8 percent received blue signals; 81.6 percent received neutral signals; 7.6 percent received red signals in reading. During 1972-1973, Resource Teachers reported at least one visit to 485 of those grades (60 percent). The observed distribution of grades visited, according to type of reading signal was 10.3 percent with blue signals, 83.1 percent with neutral signals and 6.6 percent with red signals. Thus, the observed distribution of grades visited is nearly identical to the existing or expected distribution of signals. The observed and expected distribution do not differ by more than 1.5 percent.

To determine if the differences were statistically significant, the two distributions were compared using a chi-square (or χ^2) test with two degrees of freedom and a sample size determined by the number of visits that actually occurred. The results indicate that the detected difference would be statistically significant only at a confidence level on the order of 20 percent or more. That is, the difference is not significant at any of the typically used levels of confidence, such as 1 percent, 5 percent or 10 percent. In operational terms, a 1.5 percent difference means that only 12 grades out of the 806 total (or 10 out of the 658 neutral grades) were visited that might not have been expected to be visited if assistance were provided proportionally. Similar results occur when the analyses are conducted on an Area basis and when arithmetic signals are used. The data used to obtain these results are presented in Table V-1.

TABLE V-1

EXPECTED AND OBSERVED DISTRIBUTIONS OF RESOURCE TEACHER VISITS, BY AREA AND BY SIGNAL, READING 1972-73

GRADES CONSIDERED	EXPECTED DISTRIBUTIONS[1] PERCENT OF SIGNALS			OBSERVED DISTRIBUTIONS[2] PERCENT OF SIGNALS			DIFFERENCE SIGNIFICANT AT LEVEL OF:[3]	
	Blue	Neutral	Red	Blue	Neutral	Red	1%	5%
ALL GRADES	10.8	81.6	7.6	10.3	83.1	6.6	NO	NO
AREA I	15.8	82.5	1.7	13.0	84.8	2.2	NO	NO
AREA II	3.2	86.4	10.4	3.2	87.3	9.5	NO	NO
AREA III	21.6	69.0	9.4	21.4	70.9	7.8	NO	NO
AREA IV	3.3	87.8	8.8	3.1	87.5	9.4	NO	NO
AREA V	11.1	82.8	6.1	10.1	85.9	4.0	NO	NO

1. Distribution that would be expected if visits were proportional to the distribution of signals.
2. Observed distribution of Resource Teacher visits by type of signal.
3. Statistical significance determined by a X^2 test with two degrees of freedom and a sample size equal to the number of visits that occurred.

In summary, when the number of grades visited is used as a measure of Resource Teacher assistance, there is no evidence to indicate that a disproportionate amount of assistance was given grades having a blue or red signal in reading or arithmetic. The same result is obtained when considering Resource Teacher visits to all schools in the system or the schools in each of the five Areas.

However, as has been pointed out, a measure based on whether or not a grade was visited at least once during the school year does not take into consideration the amount of assistance given. The number of grades visited is simply a measure of the minimum level of effort provided. In order to examine the amount of Resource Teacher assistance provided classroom teachers, analyses based on time expended on Resource Teacher visits have been performed. The results of those analyses follow.

b. EFFECT OF SIGNAL INFORMATION ON TIME EXPENDED DURING RESOURCE TEACHER VISITS

The length of each visit reported by Resource Teachers provides a means of weighting the amount of assistance given in a visit. If each grade had only one teacher and each Resource Teacher visited only one teacher at a time, then the reported time could be used as a measure of activity without any ambiguity. However, in most Atlanta schools, several teachers are assigned to each grade level and, on many occasions, Resource Teachers simultaneously visit several teachers from one or several grades. Personnel other than classroom teachers also participate in many visits. In order to examine the impact of signal information as measured by the length of Resource Teacher visits, a method had to be found to allocate the benefit, as measured by time spent on a visit, to the participants and the grades they represent.

Since no accepted theory exists to scale the benefit of group versus individual meetings between teacher and Resource Teacher, two definitions of time were considered:

(1) Resource Teacher Time: Each grade is allocated a proportion of the total time expended by the Resource Teacher equal to the proportion of participants who are teachers in that grade. That is, if a Resource Teacher spends a total of $\underline{t}$ minutes simultaneously visiting $\underline{n}$ persons, of whom $\underline{m}$ are teachers in grade $\underline{g}$, then a measure of time expended on grade $\underline{g}$ during the visit $\underline{v}$ is:

$$T(v,g) = \frac{m}{n}t.$$

(2) Teacher Time: Each grade is allocated a multiple of the total time expended by the Resource Teacher equal to the number of participants who are teachers in that grade. That is, if a Resource Teacher spends a total of $\underline{t}$ minutes simultaneously visiting $\underline{n}$ persons, of which $\underline{m}$ are teachers in grade $\underline{g}$, then a measure of time expended on grade $\underline{g}$ during the visit $\underline{v}$ is:

$$T'(v,g) = mt.$$

Resource Teacher time assumes that the benefit to each participant in a visit (as measured by time) is equally divided among the participants so that the sum of the benefit (time) equals exactly the time the Resource Teacher expended. On the other hand, the second measure, teacher time, assumes that all participants derive the same amount of benefit as if only one had been present. That is, in the second case, benefit to each participant is assumed to be independent of the number of teachers present.

While both measures were used in the analyses performed to determine if signal information had an effect on Resource Teacher assistance, the results obtained using Resource Teacher time did not differ from the results obtained using teacher time. Thus, while data which appear in the succeeding paragraphs refer only to Resource Teacher time, the findings are generally applicable to teacher time.

Resource Teachers reported spending 1,978 hours[31] assisting classroom teachers of Grades 1-7. If these hours had been expended in direct proportion to the signals assigned to the grades in reading, then 10.8 percent of the time would be expected to be spent in blue signaled grades, 81.6 percent in neutral grades and 7.6 percent in red signaled grades. In fact, the observed distribution of Resource Teacher time was as follows: 9.6 percent in blue signaled grades, 82.5 percent in neutral grades, and 7.9 percent in red signaled grades. As with the distribution of grades visited, the observed distribution and the expected distribution of Resource Teacher time were very similar; a χ^2 comparison of the difference is not significant at a confidence level of 25 percent or less.

The differences between the observed and the expected distribution of Resource Teacher time are even less significant when viewed in light of the operation of the school system. For example, a difference of 1 percent between observed and expected amounts of Resource Teacher time represents less than 20 hours out of the total amount reported over the entire school year. Thus, in terms of Resource Teacher time, the sum of the absolute difference between observed and expected effort given to blue, neutral and red signals represents less than 47 hours of reported Resource Teachers' time over the whole school year--hardly an operationally significant difference for the combined efforts of the 52 Resource Teachers who submitted reports. The differences detected for Resource Teacher effort relative to arithmetic signals are even smaller than for reading.

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[31] The total time reported by Resource Teachers, including assistance to principals and other staff not directly assigned to Grades 1-7 was substantially greater than 1,978 hours.

Different results are obtained when the distributions are calculated on an Area basis. In particular, the difference between the observed distributions of Resource Teacher time and the expected distribution of Resource Teacher time relative to reading signals is statistically significant at the 1 percent confidence level for Areas I, III and IV. When arithmetic signals are used, the detected differences are statistically significant at the 1 percent level only in Area III. When the level of statistical confidence is 5 percent, then detected differences relative to arithmetic signals become significant for Area I. These results are presented in Table V-2 below.

TABLE V-2

EXPECTED AND OBSERVED DISTRIBUTION OF RESOURCE TEACHER TIME,
BY AREA AND SIGNAL, 1972-73

a. Reading Signals

GRADES CONSIDERED	EXPECTED DISTRIBUTIONS[1] PERCENT OF SIGNALS			OBSERVED DISTRIBUTIONS[2] PERCENT OF SIGNALS			DIFFERENCE SIGNIFICANT AT LEVEL OF:[3]	
	Blue	Neutral	Red	Blue	Neutral	Red	1%	5%
ALL GRADES	10.8	81.6	7.6	9.6	82.5	7.9	NO	NO
AREA I	15.8	82.5	1.7	9.9	87.2	2.9	YES	YES
AREA II	3.2	86.4	10.4	1.9	89.0	9.0	NO	NO
AREA III	21.6	69.0	9.4	35.6	62.0	2.4	YES	YES
AREA IV	3.3	87.8	8.8	2.3	84.7	13.0	YES	YES
AREA V	11.1	82.8	6.1	9.9	86.9	3.1	NO	NO

(Continued on following page)

TABLE V-2 (continued)

b. Arithmetic Signals

GRADES CONSIDERED	EXPECTED DISTRIBUTIONS[1] PERCENT OF SIGNALS			OBSERVED DISTRIBUTIONS[2] PERCENT OF SIGNALS			DIFFERENCE SIGNIFICANT AT LEVEL OF:[3]	
	Blue	Neutral	Red	Blue	Neutral	Red	1%	5%
ALL GRADES	8.4	85.9	5.7	7.6	86.6	5.7	NO	NO
AREA I	10.0	89.2	0.8	6.1	92.6	1.4	NO	YES
AREA II	2.6	89.6	7.8	1.8	90.8	7.4	NO	NO
AREA III	20.5	74.3	5.3	32.5	61.2	6.3	YES	YES
AREA IV	3.3	87.8	8.8	2.3	90.3	7.4	NO	NO
AREA V	6.1	89.4	4.4	4.1	91.3	4.6	NO	NO

1. Distribution that would be expected if visits were proportional to the distribution of signals.

2. Observed distribution of Resource Teacher visits by type of signal.

3. Statistical significance determined by a χ^2 test with two degrees of freedom and a sample size equal to the number of visits that occurred.

While the differences between the observed and the expected distribution of Resource Teacher time in Areas I, III and IV were statistically significant at the 1 percent level in reading, the differences appear to have been insignificant in terms of the operation of the school system. Moreover, there was no common pattern across Areas. In Area I, there was a slight shift in attention (as measured by Resource Teacher time) away from blue signaled grades towards grades with a neutral signal. In terms of actual Resource Teacher time, the maximum detected difference in Area I represented only 22 hours of Resource Teacher effort out of a total of 368 hours reported. In Area III, Resource Teachers spent more time than expected with blue signaled grades (in reading and arithmetic) at the expense of both red and neutral signaled grades. The differences between observed and expected values in the blue signaled grades of Area III represented about 31 hours out of the 290 hours reported by Resource Teachers in that Area. In Area IV, effort was shifted from neutral signaled grades to red signaled grades. The differential effort on red signaled grades represented 37 hours out of the 890 hours reported.

Thus, except possibly in Area III, data collected on how Resource Teachers expended time provide no evidence to indicate that grades were singled out for attention according to the signal they received during the previous school year. This finding is particularly true when the distribution of time is considered relative to math signals.

In still another effort to examine the distribution of direct assistance provided by Resource Teachers, a measure based on the frequency of visits was utilized to weight the attention given to grades visited. These analyses are discussed below.

c. EFFECT OF SIGNAL INFORMATION ON THE FREQUENCY OF RESOURCE TEACHER VISITS

As with the time expended, a measure of Resource Teacher activity based on frequency of visits provides a means of weighting the amount of attention given to grades having different types of signals. If each grade had only one teacher and a Resource Teacher visited only one teacher at a time, then the frequency of visits to a particular grade would be equal to the number of visits reported. However, as has already been pointed out, most grades have several teachers and many visits involve several teachers from one or more grades. Therefore, as with the "time" measures, it was necessary to adopt some mechanism to distribute each visit among all the participants.

Once again, two measures for the frequency of visits to classroom teachers were defined. They parallel the measures defined for time spent assisting teachers. One measure allocates each Resource Teacher visit among all participants in the visit, on the assumption that the benefit to the participants is shared equally. The other measure assumes that the benefits to each participant is independent of the number of participants and, therefore, allocates one visit to each participant.

When both measures were used to analyze Resource Teacher data, the results were the same regardless of how frequency of visit was defined. The results are also nearly identical with those reported above when time was used as a measure of Resource Teacher activity. In particular, when all grades are considered without regard to Area, the observed distribution of visits is quite close to the distribution which would have been expected if the visits had been allocated in direct proportion to the number of grades having blue, neutral or red signals. For example, for grades signaled in reading, the observed distribution of visits was 10.4 percent to blue signaled grades, 81.6 percent to neutral signaled grades and 8.1 percent to red signaled grades, almost identical to the expected distribution of 10.8 percent blue, 81.6 percent neutral, and 7.6 percent red. Using a X^2 test of significance, the differences between these distributions are not significant at confidence levels up to 50 percent. The maximum difference between the distributions occurs relative to the red signals and that is only a difference of 0.5 percent. This represents a total of less than 10 of the 1,875 visits reported by all Resource Teachers for the entire year. The results of the analyses of Resource Teacher frequency of visits may be found in Table V-3.

TABLE V-3

EXPECTED AND OBSERVED DISTRIBUTION OF THE FREQUENCY OF RESOURCE TEACHER VISITS BY AREA AND BY SIGNAL, 1972-73

a. **Reading Signals**

GRADES CONSIDERED	EXPECTED DISTRIBUTIONS[1] PERCENT OF SIGNALS			OBSERVED DISTRIBUTIONS[2] PERCENT OF SIGNALS			DIFFERENCE SIGNIFICANT AT LEVEL OF:[3]	
	Blue	Neutral	Red	Blue	Neutral	Red	1%	5%
ALL GRADES	10.8	81.6	7.6	10.4	81.6	8.1	NO	NO
AREA I	15.8	82.5	1.7	9.8	87.2	3.0	YES	YES
AREA II	3.2	86.4	10.4	2.1	86.5	11.4	NO	NO
AREA III	21.6	69.0	9.4	36.9	59.5	3.6	YES	YES
AREA IV	3.3	87.8	8.8	2.2	85.3	12.5	YES	YES
AREA V	11.1	82.8	6.1	9.3	87.0	3.7	NO	NO

b. Arithmetic Signals

ALL GRADES	8.4	85.9	5.7	8.5	86.2	5.3	NO	NO
AREA I	10.0	89.2	0.8	5.8	92.8	1.5	NO	YES
AREA II	2.6	89.6	7.8	2.2	89.8	8.0	NO	NO
AREA III	20.5	74.3	5.3	34.1	60.7	5.1	YES	YES
AREA IV	3.3	87.8	8.8	2.3	91.2	6.5	NO	YES
AREA V	6.1	89.4	4.4	3.4	90.8	5.7	NO	NO

1. Distribution that would be expected if visits were proportional to the distribution of signals.

2. Observed distribution of Resource Teacher visits by type of signal.

3. Statistical significance determined by a X^2 test with two degrees of freedom and a sample size equal to the number of visits that occurred.

As when time was used as a measure of Resource Teacher assistance, statistically significant differences between the observed and expected frequency distributions appear in Areas I, III and IV in reading (at the 1 percent level) and in arithmetic in Area III (at the 1 percent level) and in Areas I and IV (at the 5 percent level). However, only in Area III do the differences appear large enough to have some operational significance.

There is no pattern to the differences observed among Areas for reading. In Area I, red and neutral signaled grades were visited slightly more often than blue signaled grades, but in operational terms, that difference represented only about 21 visits out of 357 reported. In Area III, blue signaled grades were visited more often, at the expense of neutral and red signaled grades; the difference amounted to 57 of the 373 visits reported. In Area IV, red signaled grades were visited at the expense of neutral and blue signaled grades, but the difference represented only 29 visits out of 793 reported.

In summary, analyses using the distribution of visits as a measure of activity corroborate the results obtained when time was used as a measure of activity. That is, when all grades are considered, reported Resource Teacher activity was distributed among grades having blue, neutral and red signals in nearly the same proportions as the signals were distributed. And, while statistically significant differences between the observed and proportionate distribution were detected in Areas I, III and IV, only in Area III were the differences large enough to have operational significance for the school system.

d. FINDINGS

The preceding analyses have been addressed to the question of whether or not Resource Teachers gave a disproportionate amount of assistance to grades in 1972-73 which had received a particular type of signal in April 1972. Resource Teacher assistance was measured in terms of the number of grades visited, the amount of time spent in assisting teachers in those grades, and the frequency of visits to those teachers. It was assumed that if signal information had no effect on the allocation of Resource Teacher assistance, then the observed distribution of any measure would be proportional to the distribution of blue, neutral and red signals among existing grades. The results may be summarized as follows:

- When all grades were considered without regard to Area, no statistically significant differences were detected between the observed distribution of Resource Teacher assistance and the expected distribution. This result applies when Resource Teacher assistance is measured by grades visited, time expended or frequency of visits. The result holds when either reading or arithmetic signals are used to define Resource Teacher assistance.

- When Resource Teacher assistance was examined on an Area basis, no statistically significant differences were detected between the observed distribution of grades visited and the expected distribution. The result holds when either reading or arithmetic signals are used to define Resource Teacher assistance.

- When either time expended or frequency of visits was used as a measure of Resource Teacher assistance, statistically significant differences were detected in Areas I, III and IV. The greatest differences occurred relative to reading signals. Only in Area III, however, did the differences appear large enough to have any significance in terms of the operation of the Area.

2. THE IMPACT OF SIGNAL INFORMATION ON THE RESOURCE TEACHER ASSISTANCE PROVIDED

The analyses presented in the preceding section focused on the allocation of Resource Teacher assistance. This section discusses the variation in Resource Teacher assistance to those grades which were visited at all. The grades visited by Resource Teachers were categorized by the type of signal each grade received in reading[32] in 1972. The amount of Resource Teacher assistance (as measured by time expended and by frequency of visits) to blue, neutral and red signaled grades was calculated. The distribution of Resource Teacher time and the frequency of Resource Teacher visits for each type of signal have been compared to determine whether Resource Teachers gave a disproportionate amount of assistance to either blue, neutral or red signaled grades. There was no way to determine in advance of the study whether there should be a difference in the amount of assistance provided or how much that difference should be.

a. OBSERVED EFFECT OF SIGNALS IN TERMS OF TIME EXPENDED

Once again, Resource Teacher time[33] was used as a measure of Resource Teacher assistance. The total amount of Resource Teacher time spent in a grade over the entire year was determined, and cumulative frequency distributions, using intervals of 15 minutes in length, were prepared for blue, neutral and red signaled grades. The three cumulative frequency distributions are presented in Figure V-1. Each curve in Figure V-1 is presented as a smooth approximation to the step function actually calculated.

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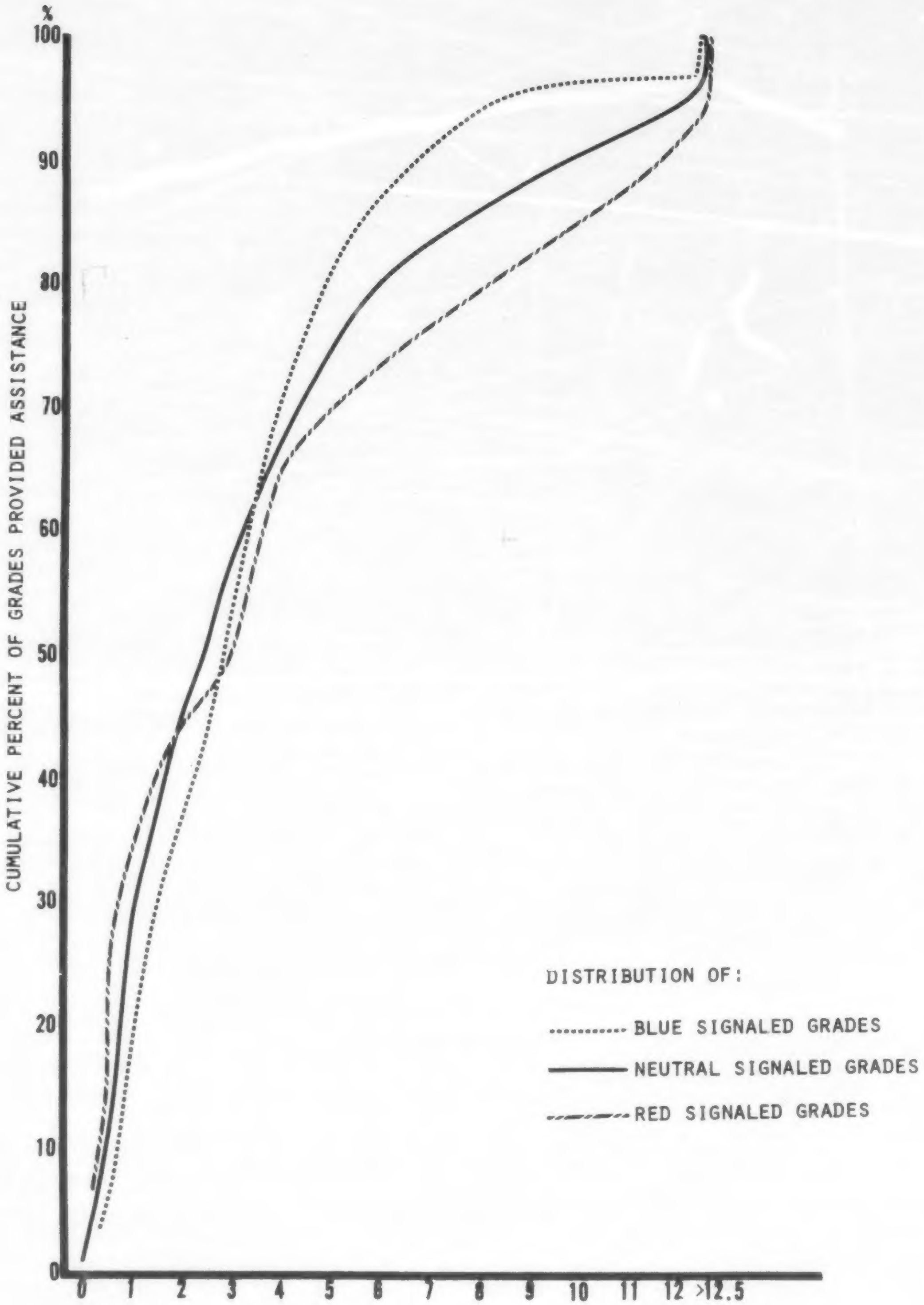
[32] Each of the analyses discussed in this section was conducted for arithmetic, as well as reading. The results were essentially the same for reading and arithmetic, and only the results for reading are presented.

[33] See p. 120 for the definition of Resource Teacher time.

FIGURE V-1

CUMULATIVE FREQUENCY DISTRIBUTION OF GRADES ASSISTED BY RESOURCE TEACHERS: TOTAL HOURS OF ASSISTANCE PROVIDED DURING 1972-1973



As can be seen from observing the three curves in Figure V-1, they are remarkably similar. In fact, using the Kolmogorov-Smirnov Two-sample Test for cumulative distributions, the detected differences for reading are not significant at the five percent confidence level when either the distributions are considered for either:

blue and neutral signaled grades, or
blue and red signaled grades, or
red and neutral signaled grades.

The curves in Figure V-1 differ noticeably only when we consider grades in which a large amount of time was expended over the year by Resource Teachers. Specifically, approximately 20 percent of the red signaled grades visited received at least eight hours of attention but only 6 percent of blue signaled grades received that much assistance from Resource Teachers. These observations indicate that Resource Teachers favor red signaled grades when expending a relatively large amount of time.[34] However, the differences are neither statistically significant nor large enough to be operationally significant.

The variation among the curves for large time values does have an effect on the measures of central tendency (which give weight to extreme values of a distribution). In particular, the mean or average time expended over the year in grades with each type of signal is as follows: blue signaled grades--3.44 hours; neutral grades--3.74 hours; and red signaled grades--4.24 hours. However, using a t-test, the differences in mean time between red signaled grades and blue or neutral signaled grades are not even statistically significant at a 10 percent confidence level. The observed differences result from a few red signaled grades which received a large amount of Resource Teacher; when the median is used as a measure of measure of central tendency, the differences are even less. In particular, the median amount of time expended in each category of signals is as follows: blue--2.88 hours; neutral--2.50 hours; and red--2.92 hours. Clearly, these are not operationally significant differences.

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[34] Note that the expended time is the total amount of time reported as being expended over the entire year by all the Resource Teachers.

In summary, while differences can be detected in the distribution of Resource Teacher time spent in grades having a blue, neutral or red signal in reading, the differences generally are not significant and do not indicate a pervasive tendency to provide assistance to grades having a particular type of signal.

b. OBSERVED EFFECT OF SIGNALS IN TERMS OF FREQUENCY OF VISITS

The frequency of Resource Teacher visits[35] was also used as a measure of Resource Teacher assistance. The total number of Resource Teacher visits to each grade was calculated. Cumulative frequency distributions based on the total number of visits reported over the entire year were prepared for the blue, neutral and red signaled grades. The three cumulative frequency distributions are presented in Figure V-2. Once again, the curves appear as smooth approximations of the step functions actually calculated.

As can be observed, the three distributions tend to behave similarly. In fact, using the Kalmogorov-Smirnov Two-sample Test, the distributions of the frequency of visit measure are not statistically significant when considering the distributions for reading relative to:

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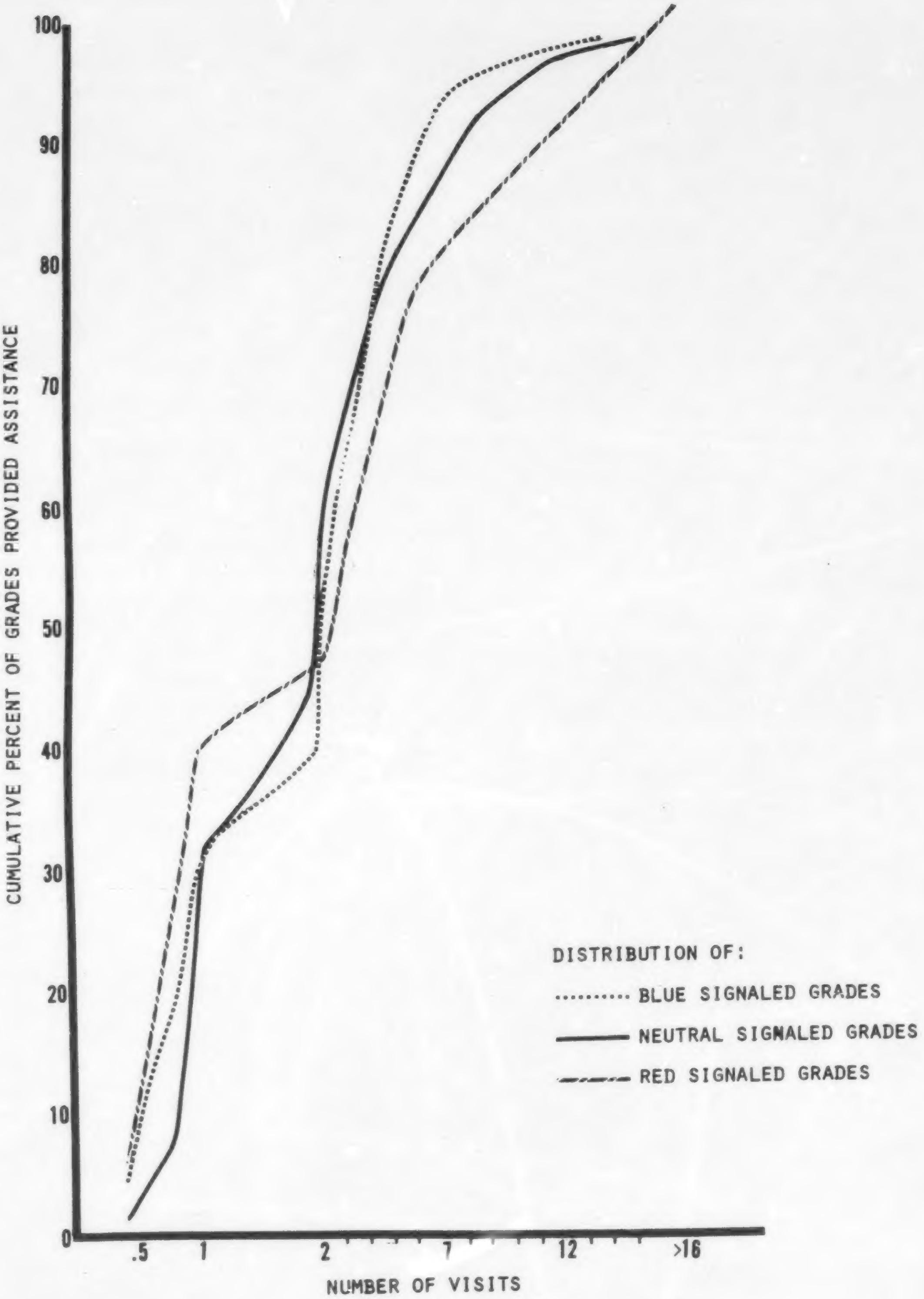
[35] See p. 124 for the definition of frequency of visit.

FIGURE V-2

CUMULATIVE FREQUENCY DISTRIBUTION OF GRADES ASSISTED BY RESOURCE TEACHERS: TOTAL NUMBER OF VISITS OCCURRING DURING 1972-73



NOTE: THE HORIZONTAL AXIS--THE NUMBER OF VISITS--HAS BEEN ELONGATED BETWEEN 0 AND 2 TO DISPLAY THE CUMULATIVE EFFECT OF VISITS THAT INVOLVE SEVERAL CLASSROOM TEACHERS. THAT IS, EACH GRADE RECEIVES A PROPORTIONAL CREDIT FOR THE VISIT EQUAL TO THE PROPORTION OF TEACHERS FROM THAT GRADE WHO WERE INVOLVED IN THE VISIT.

blue and neutral signaled grades,
blue and red signaled grades, and
red and neutral signaled grades.

As with the distributions of time expended, the curve for the distribution of visits for grades which had a red reading signal dominates the other two curves for small values of the measure; the reverse is true for grades which received a relatively large number of Resource Teacher visits. However, the difference between the curves for large values of the "frequency of visit measure" is not as great as when "time" was used as a measure of activity. Thus, the means or averages for the distributions in Figure V-2 do not differ from one another as much as when time was the measure of activity. In particular, the mean or average number of visits that occurred to grades having blue signals was 1.9 visits; for neutral signals, 2.0 visits; and for red signals, 2.6 visits. The medians for the three distributions are 2.7, 2.3 and 2.8 visits respectively. Clearly, the differences that exist between these measures of central tendency of the distributions of Resource Teacher effort among grades having blue, neutral or red signals does not have much significance in terms of the operation of the school system.

3. SUMMARY OF FINDINGS ABOUT THE IMPACT OF SIGNALS ON RESOURCE TEACHERS

The analyses of the characteristics of the Resource Teacher visits which were reported in 1972-73 failed to show any operationally important tendency for Resource Teachers to single out either blue, neutral or red signaled grades for special attention. Analyses have also been conducted on a grade level basis as well as on an Area basis. In a few cases, statistically significant differences were detected between the observed and expected distributions, but none of the differences have obvious operational significance nor are they as great as those detected in the Area analyses. Furthermore, there is no apparent pattern of differential assistance to a particular grade or group of grades having a particular type of signal. For these reasons, the detailed discussions of the grade-by-grade analysis have been omitted from this report.

The results and implications of the findings on the impact of signals that have been reported in this chapter are discussed in Chapter I of this report.